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Taxonomic Studies on the Shallow Water Gammaridean Amphipoda of West Kyushu, Japan V. Leucothoidae, Liljeborgiidae, Lysianassidae (Prachynella, Aristias, Waldeckia, Ensayara, Lepidepecreum, Hippomedon and Anonyx)

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**Taxonomic Studies on the Shallow Water Gammaridean  
Amphipoda of West Kyushu, Japan**  
**V. Leucothoidae, Liljeborgiidae, Lysianassidae (*Prachynella*,  
*Aristias*, *Waldeckia*, *Ensayara*, *Lepidepcreum*, *Hippomedon*  
and *Anonyx*)<sup>1)</sup>**

By

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With Text-figures 162-196

Leucothoidae

Key to the genera of Leucothoidae

- 1 The greater part of coxa 1 concealed by coxa 2, palp on one mandible  
uniarticulate and on the other triarticulate ..... *Leucothoides*  
Coxa 1 not concealed by coxa 2, palp on both mandible triarticulate..... *Leucothoe*

*Leucothoides*

***Leucothoides pottsi* shoemaker, 1933**

(Figs 162-165)

*L. pottsi*: Schellenberg 1938, p. 26-28; J.L. Barnard 1965a, p. 492-493; Ledoyer 1967, p. 13; Ledoyer 1968, p. 34; J.L. Barnard 1970b, p. 211, p. 213; J.L. Barnard 1971a, p. 103; J.L. Barnard 1974, p. 103; Ledoyer 1978a, p. 375; Ledoyer 1978b, p. 300, p. 302; J.L. Barnard 1979, p. 130; Ledoyer 1979, p. 167.

Material examined: Male (?), 2.25 mm. Tomioka Bay. Collection No.: AMBL-Amph. 102. (2 specimens).

Body: Head subequal to pereonite 1 in length; anterior head lobe broadly produced, rounded; rostrum short, narrow. Eyes large, circular. Pereonites subequal in length, coxae 2-4 well developed, especially coxa 2 extending forward,

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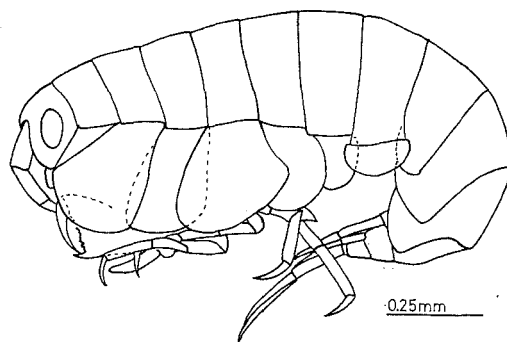


Fig. 162. *Leucothoides pottsi* Shoemaker. Male (?), 2.25 mm.

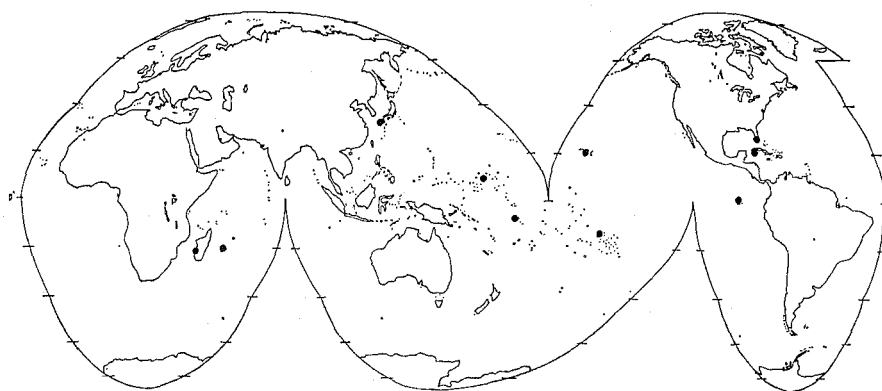


Fig. 163. Distribution of *Leucothoides pottsi* Shoemaker (●) in the world.

concealing the greater part of coxa 1. Pleonites subequal in length; pleonal epimera subrectangular; pleonal epimera 2–3 similar, broader than pleonal epimeron 1, prominently and broadly produced forward, posteroventrally rectangular. Urosomite 1 slightly concave dorsomedially, ventroposterior end with 2 opposite lateral spines; urosomite 2 very short; urosomite 3 half as long as urosomite 1, dorsal part very short.

**Antennae:** Antennae shorter than half as long as body length. Segment 1 of peduncle of antenna 1 about half as long as head length, ventrodistally with 2 small pinnate and 1 small unpinnate setae, segments 2–3  $\frac{3}{4}$  as long as segment 1, segment 3 subequal to segment 2 in length; accessory flagellum uniarticulate, very small, spine-like; primary flagellum 8-articulate, with 1 distal aesthetasc except for proximal and terminal segments. Segment 2 of peduncle of antenna 2 short, lacking gland cone, segment 3 a little stout, obliquely truncate, with only 3 distal setae, segment 4 geniculating to segment 3, about half as long as it, segment 5 about  $\frac{3}{4}$  as long as and distinctly slenderer than segment 4; flagellum triarticulate, half as long as segment 4 of peduncle, segment 1 about  $\frac{2}{3}$  as long as flagellum.

**Mouthparts:** Upper and lower lips unknown. Inner plate of maxilla 1 medium, rounded apically, with 1 seta; outer plate slightly depressed medially, innerdistally

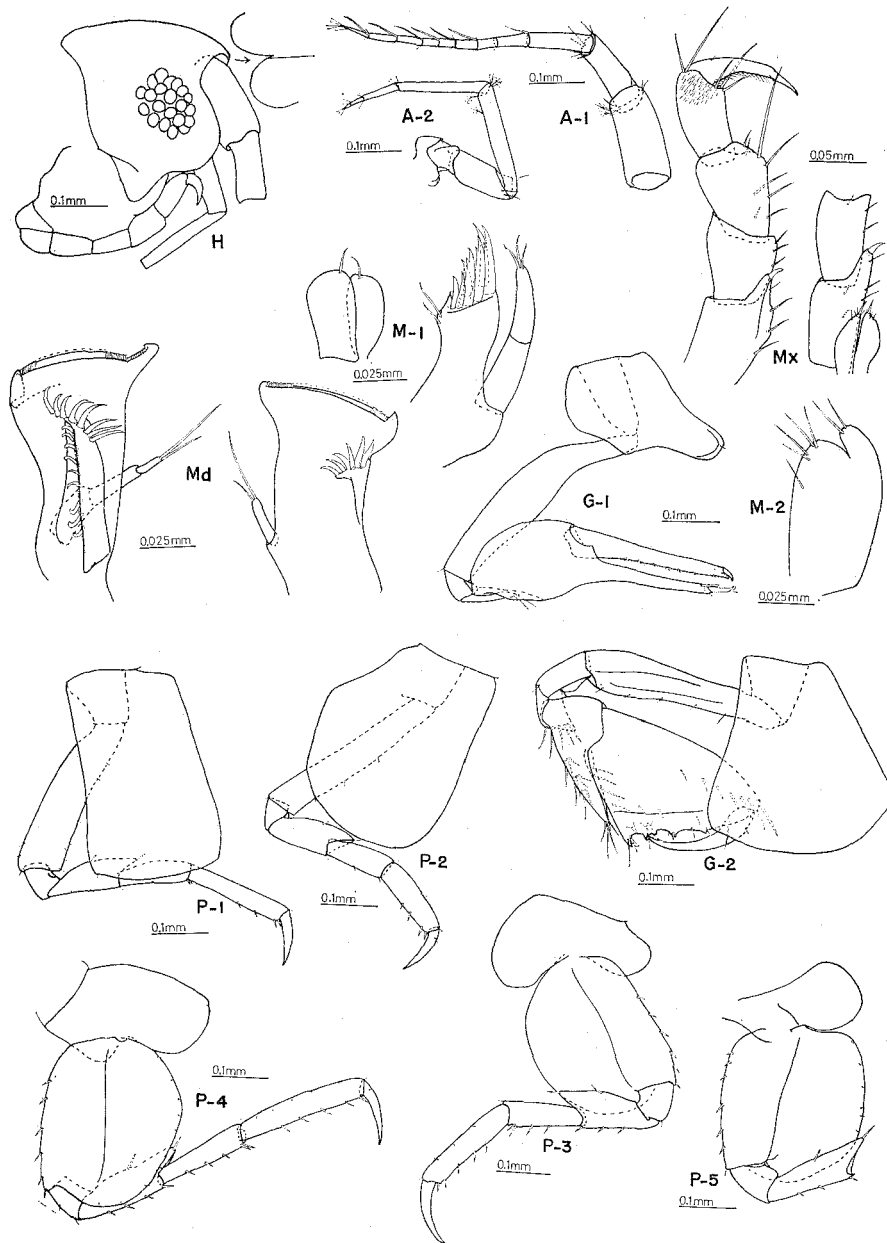


Fig. 164. *Leucothoides pottsi* Shoemaker. Male (?), 2.25 mm.

with 2 short setae and 1 apical tooth, else apically with 2 smaller and 5 stouter tooth-like spines, these stouter spines with 1 small tooth near apex; palp slender, biarticulate, decreasing in thickness, not extending beyond spine of outer plate, terminal segment as long as proximal segment, apically with 3 setae. Both plates of maxilla 2 coalescent, divided by notch, inner plate broad, with 5 setae, outer

plate with 2 setae. Mandibles lacking lacinia mobilis and molar process, lateral longitudinal ridge finely serrate, with 9 accessory blades, incisor broad, finely serrate, distal opposite angles with 1 stout or smaller tooth; one mandible with 1 oblique row of 8 accessory blades and triarticulate palp, the other with 1 oblique row of 6 accessory blade and uniarticulate palp, apex of both palps with 2 setae. Inner plate of maxilliped small, rounded on outer margin, apically with 4 minute and 1 stout setae; outer plate small, attenuate, not reaching middle of proximal segment of palp, with 1 apical stout tooth; palp stout, 4-articulate, subequal in length, less setose, upper distal part of segment 3 densely bristly, dactyl longer than segment 3, falcate, grasping margin bristly.

Gnathopod 1: Coxa 1 prominently produced downward and forward antero-ventrally. Gnathopod 1 chelate. Basis about  $3/7$  as long as gnathopod 1, slender, especially narrow and twisted on  $1/3$  part from base. Ischium short, longer than wide. Merus longer than ischium, slender, scale-like, with 2 distal setae. Carpus reaching apex of dactyl, basal part dilated, posterior expansion slender, attenuate; apex with 1 nail-like tooth pectinated on inner margin and hooded, else with 1 pectinate smaller spine. Propod slender, attenuate, producing posterodistally, inner margin with 1 proximal minute seta and 7 groups of 1 spine and 2 minute setae. Dactyl small, nail-like, not extending beyond apical tooth of carpus.

Gnathopod 2: Coxa 2 gradually expanding downward, ventrally rounded. Gnathopod 2 subchelate. Basis slender, subequal to propod in length. Ischium  $1/3$  as long as basis. Merus shorter than ischium, broad and thin, distally with 5 short setae. Carpus triangular, extending near posterodistal end of propod, its extension stout, attenuate, densely bristly, setae formula on inner-posterior submargin 3-3-2, inner-anterior margin with 1 longitudinal row of 4 setae, apex with 4 setae. Propod increasing in width, produced and pointed posterodistally, half part of inner-anterior submargin from distal end with 1 longitudinal row of 7 small and stout setae; palm oblique, straight, with 4 small cusps of which medial one is bifid and is armed with 1 spine, palmar defining tooth with 1 spine, else inner posterodistal part with 3 spines. Dactyl stout, not reaching posterodistal end of palm, falcate, with 1 tooth near apex.

Pereopod 1: Coxa 3 rectangular. Basis  $1/3$  as long as pereopod 1, almost uniform in width. Ischium short, longer than wide. Merus prominently extended anterodistally, increasing in width on half part from base, anteriorly with 2 medial and apical spines. Carpus as long as posterior length of merus, posteriorly with 1 medial seta and 2 distal paired spines. Propod as long as ischium and merus combined, half part of posterior margin from distal end with 2 single and 2 distal single spines. Dactyl half as long as propod, falcate.

Pereopod 2: Coxa 4 expanding backward medially, ventrally rounded. Pereopod 2 similar to pereopod 1.

Pereopod 3: Coxa 5 bilobate, anterior lobe produced forward, posterior lobe extended downward. Basis broadly expanded, oval, with 6 anterior spines. Ischium short, longer than wide. Merus gradually expanding backward on half

part from base, prominently extended forward anteriorly, posteriorly with 2 medial and apical spines, anteriorly with 2 medial and 1 distal spines. Carpus as long as anterior length of merus, anteriorly with 2 medial and 2 distal paired spines, postero-distally with 1 spine. Propod  $3/2$  as long as carpus, anteriorly with 3 single and 2 distal single spines. Dactyl half as long as propod, falcate.

Pereopod 4: Coxa 6 bilobate, anterior lobe small, posterior lobe much extended downward, subrectangular. Pereopod 4 very similar to pereopod 3 except merus posteriorly with 4 spines, and carpus with 3 and 2 distal paired spines.

Pereopod 5: Coxa 7 rounded. Basis broadly extended, oval, anteriorly with 7 spines. Ischium short, longer than wide. Merus similar to one of pereopod 3. Carpus, propod and dactyl unknown.

Pleopods: Pleopod slender, peduncle as long as rami; outer ramus 7-articulate; inner ramus 5-articulate, proximal segment with 2 bifid setae; terminal swimming setae longer than rami.

Uropods: Inner ramus of uropod 1 extending beyond uropod 2, peduncle  $3/4$  as long as inner ramus, with 6 outer and 3 inner spines; rami attenuate, outer ramus half as long as inner ramus, with 2 spines, inner ramus with 3 spines on half part from distal end. Uropod 2  $6/7$  as long as uropod 1, similar to it in shape, peduncle with 2 outer and 1 inner apical spines; outer ramus with 2 spines, inner ramus with 2 spines on half part from distal end. Uropod 3 elongate, extending far beyond uropod 2, peduncle shorter than inner ramus, with 4 outer and 1 inner apical spines; rami attenuate, outer ramus  $2/3$  as long as inner ramus, with 1 medial spine, inner ramus with 4 spines.

Telson: Telson entire, broad, semioval, slightly extending beyond urosomite 3, apically with 2 opposite minute setae.

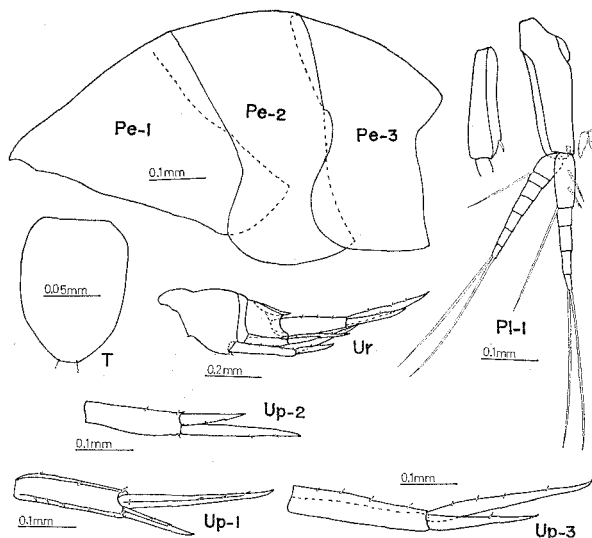


Fig. 165. *Leucothoides pottsi* Shoemaker. Male (?), 2.25 mm.

*Remarks.* The present specimens at my hand well agree with *Leucothoe pottsi* reported by K. Schellenberg (1938), M. Ledoyer (1967) and J.L. Barnard (1970b, 1974) except for the posterior margin of basis on the pereopod 5 weakly serrate and triarticulate palp of one mandible presumably failed to notice. The present species is new to Japan.

*Leucothoe*

Key to the species of *Leucothoe*

- 1 Posterodistal angle of pleonal epimeron 3 rounded ..... *L. alata*  
 Posterodistal angle of pleonal epimeron 3 with 2 teeth ..... *L. bidens*

*Leucothoe alata* J. L. Barnard, 1959

(Figs 166–169)

*L. alata*: J.L. Barnard 1962, p. 132; J.L. Barnard 1963b, p. 227; Nagata 1965a, p. 158–159;

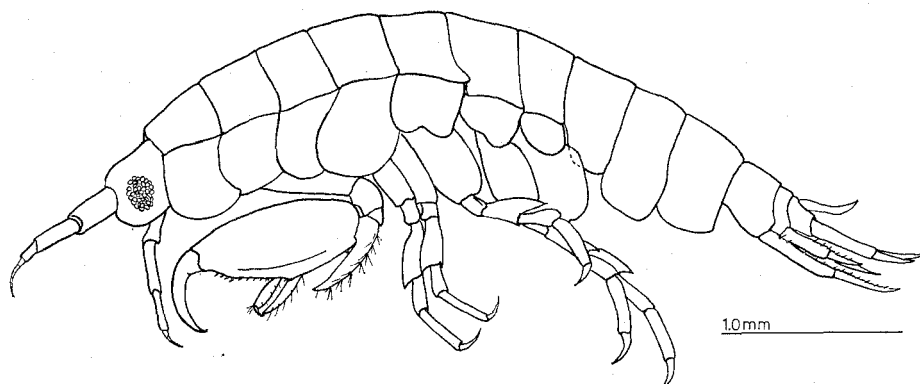


Fig. 166. *Leucothoe alata* J.L. Barnard. Male, 4.5 mm.

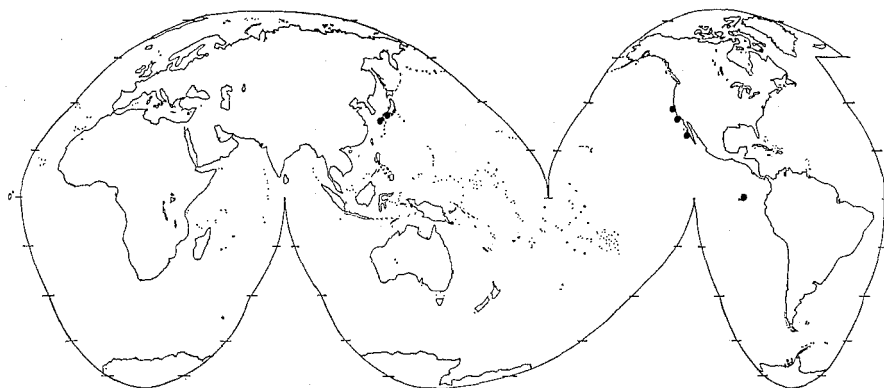


Fig. 167. Distribution of *Leucothoe alata* J.L. Barnard (●) in the world.

J.L. Barnard 1969b, p. 164; J.L. Barnard 1979, p. 128-129.

Material examined: Male, 4.5 mm. Tomioka Bay, Shijiki Bay. Collection No.: AML-Amph. 37. (4 specimens).

*Remarks.* See Nagata's (1965a) for the description.

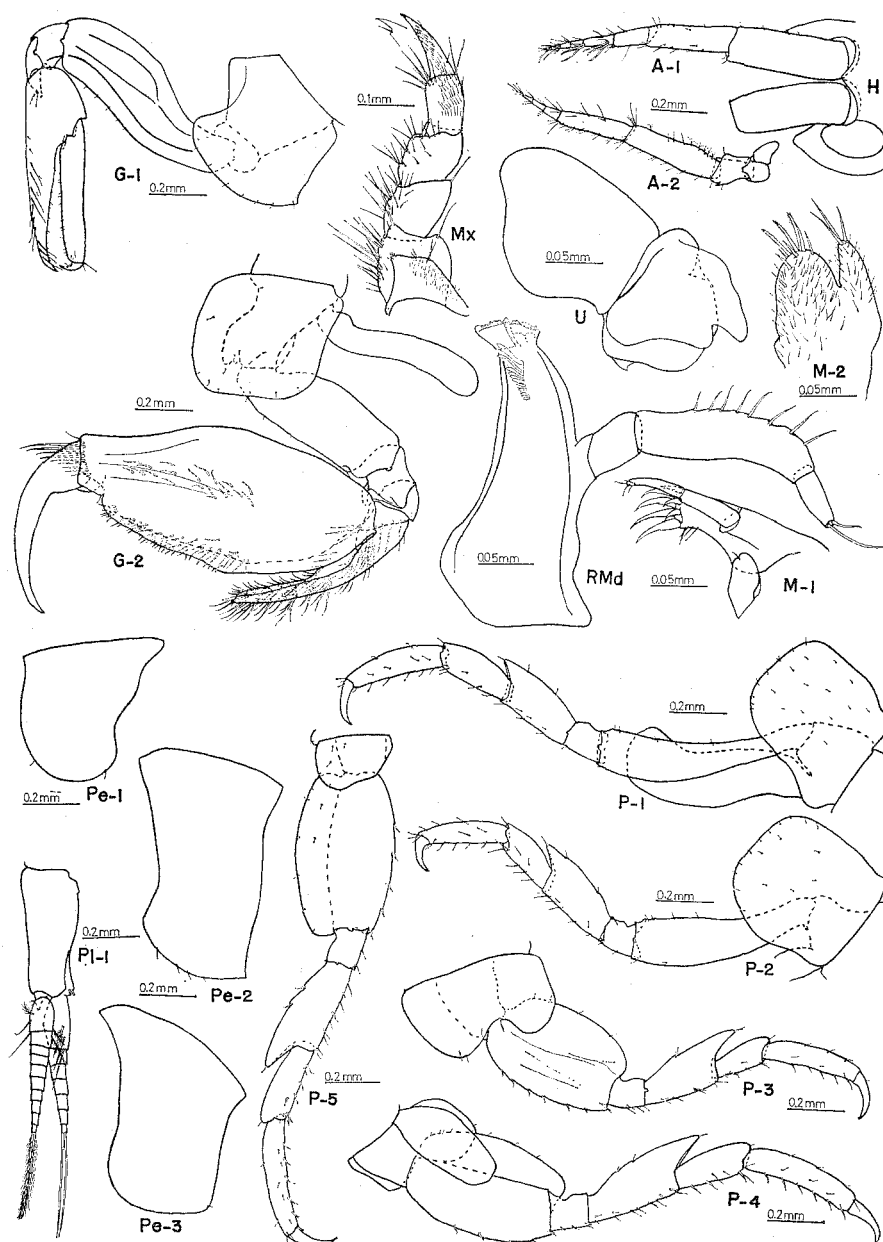


Fig. 168. *Leucothoe alata* J.L. Barnard. Male, 4.5 mm.



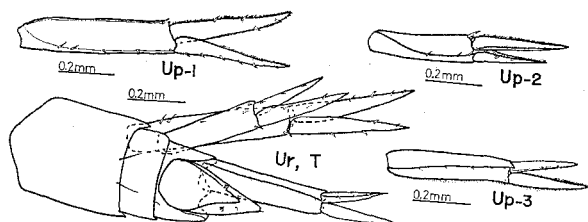


Fig. 169. *Leucothoe alata* J.L. Barnard. Male, 4.5 mm.

***Leucothoe bidens* sp. nov.**

(Fig. 170)

No *Leucothoe incisa* Robertson, 1892; Nagata 1965a, p. 157-158.

Body: External appearance well agree with *L. incisa* (Chevreux & Fage 1925, Krapp-Schickel 1975) except for the following points; head with 2 opposite lonely facet, anteroventral angle of pleonal epimeron 1 with 5 stiff setae, ventral margin of pleonal epimeron 2 with 6 spines and its posteroventral angle not upturned, posteroventral angle of pleonal epimeron 3 with 2 teeth.

Antennae: Both antennae subequal in length, stout. Segment 1 of peduncle on antenna 1 shorter than head length, segment 2 as long as segment 1, segment 3  $1/3$  as long as segment 2; accessory flagellum absent; primary flagellum 7-articulate. Segment 5 of peduncle on antenna 2 shorter than segment 4; primary flagellum 5-articulate.

Mouthparts: Upper lip asymmetrically bilobate, epistom scimitar. Inner plates of lower lip coalescent, densely pubescent, shoulders densely pubescent, mandibular process obsolescent. Inner plate of maxilla 1 small, oval, with only 1 apical seta; outer plate apically with 1 simple and 5 bifid tooth-like spines, on inner distal margin with 1 small tooth and 5 setae; palp biarticulate, but its joint obscure, terminal segment apically with 1 stout tooth and 3 setae. Outer plate of maxilla 2 pubescent, only with 3 apical setae; inner plate shorter and broader than outer plate, rectangular, dispersively pubescent apically, with 8 inner setae overall. Left mandible lacking molar process, dorsally with 1 slender laminal plate; incisor broad, with 7 blunt teeth; lacinia mobilis sectorial and small, with 10 blunt teeth; accessory blades 13, gradually shortening; palpal hump prominently produced as a part of palp; palp rather feeble, weakly developed, triarticulate, medial segment half as long as palp, with 5 short and long setae on one side margin, terminal segment about  $2/3$  as long as proceeding segment, clavate, only with 2 long and short setae. Right mandible similar to left mandible except for 2 following points; (1) incisor not pectinate, smooth except for a part with a few teeth, and (2) lacinia mobilis obsolescent. Inner plate of maxilliped small, dispersively pubescent, with 4 apical small setae; outer plate vestigial, only with 1 apical spine; palp stout, 4-articulate, segments subequal in length, dactyl falcate, inner margin bristly.

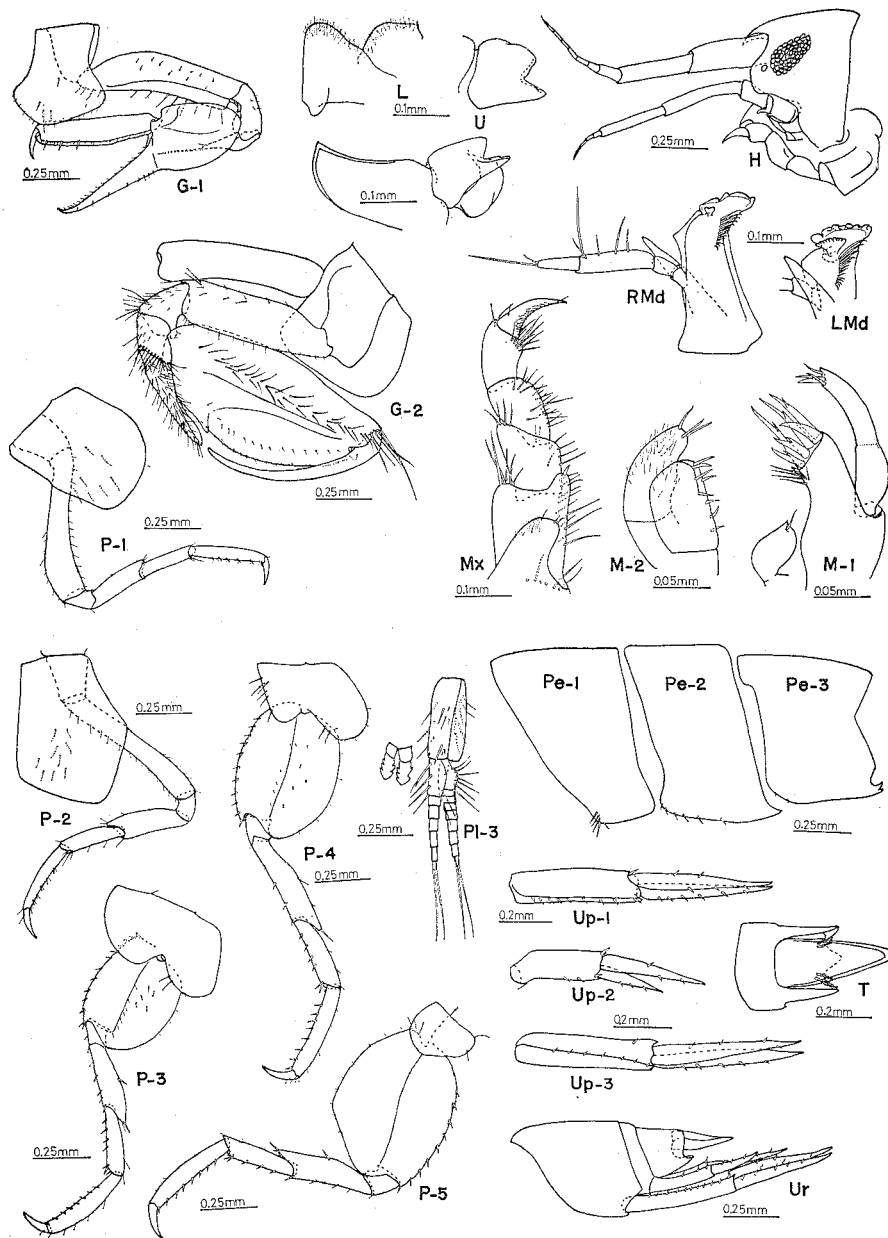


Fig. 170. *Leucothoe bidens* sp. nov. Female, 4.5 mm.

Gnathopod 1: Coxa 1 prominently expanded and rounded ventrally. Gnathopod 1 similar to one of *L. incisa* (Krapp-Schikel 1975) except for grasping margin of carpus not crenulate and half part from distal end on palm with 3 spines.

Gnathopod 2: Coxa 2 rectangular, wider than deep. Gnathopod 2 similar to one of *L. incisa* (Chevreux & Fage 1925, Krapp-Schikel 1975) except for apex of carpus rounded and lacking spines, and palm defined by tooth.

Pereopods 1-5: Pereopods 1-5 very similar to those of *L. incisa* (Krapp-Schikel 1975).

Pleopods: Peduncle of pleopod 3 shorter than rami, setose, inner-laterodistally with 2 small and 1 long spines and one pair of coupling spines; outer ramus 9-articulate, outer margin of proximal segment with 7 setae; inner ramus 7-articulate, inner margin of proximal segment with 1 bifid and 3 ordinary pinnate setae; terminal swimming setae 2/3 as long as rami.

Uropods: Peduncle of uropod 1 as long as rami, with 9 outer and 1 inner distal spines; rami equal in length, attenuate, outer ramus with 6 outer spines, inner ramus with 3 outer and 2 inner spines. Uropod 2 about 3/4 as long as uropod 1, peduncle shorter than inner ramus, with 3 outer and 1 inner apical spines; rami attenuate, outer ramus 2/3 as long as inner ramus, with 3 outer spines, inner ramus with 2 outer and 1 inner spines. Uropod 3 longer than uropod 1, peduncle subequal to rami in length, with 7 outer and 1 inner apical spines; rami equal in length, attenuate, outer ramus with 5 outer spines, inner ramus with only 1 outer distal and 3 inner spines.

Telson: Telson subequal to peduncle of uropod 3 in length, triangular, rounded apically, with 2 opposite groups of 2 pinnate setae on outer medial margin and 2 apical small setae.

Material examined. Holotype: Female, 4.5 mm. Type-locality: Tomioka Bay. Date: May, 1978. Paratype: 3 specimens. Collection No.: AMBL-Amph. 82.

*Remarks.* The material reported by Nagata (1965a) as *Leucothoe incisa* from Japan differs from *L. incisa* Robertson, 1892, in the following character states: (1) posterior tooth of pleonal epimeron 2 upturned, (2) pleonal epimeron 3 with only 1 tooth, (3) apex of carpus lobe on gnathopod 1 bifid, (4) palm of propod on gnathopod 1 crenulate, (5) palm of gnathopod 2 defined by tooth, and (6) telson with 2 medial opposite groups of 2 pinnate setae. Nagata's material is identified with the present new species, *L. bidens*.

### Liljeborgiidae

#### Key to the genera of Liljeborgiidae

- 1 Gnathopod 1 larger than gnathopod 2 ..... *Indunella*  
    Gnathopod 1 smaller than gnathopod 2 ..... 2
- 2 Carpus of gnathopods 1-2 strongly extending along propod ..... *Liljeborgia*  
    Carpus of gnathopods 1-2 weakly produced ..... *Listriella*

### *Indunella*

#### *Indunella curvidactyla* Nagata, 1965

*I. curvidactyla*: Nagata 1965a, p. 167-168.

Material examined: Ariake Sea, Shijiki Bay.

*Liljeborgia*

Key to the species of *Liljeborgia*

- 1 Inner apical tooth on both lobes of telson extending beyond outer tooth ..... *L. serrata*  
Outer apical tooth on both lobes of telson extending beyond inner tooth ..... *L. japonica*

*Liljeborgia serrata* Nagata, 1965

*L. serrata*: Nagata 1965a, p. 164-166.

Material examined: Ariake Sea, Shijiki Bay.

*Liljeborgia japonica* Nagata, 1965

*L. japonica*: Nagata 1965a, p. 160-164.

Material examined: Tomioka Bay, Shijiki Bay.

*Listriella*

*Listriella orientalis* sp. nov.

(Figs 171-174)

Body: Head shorter than pereonites 1-2 combined, anterior head lobe producing to middle of peduncular segment 1 of antenna 1. Eyes medium, oval.

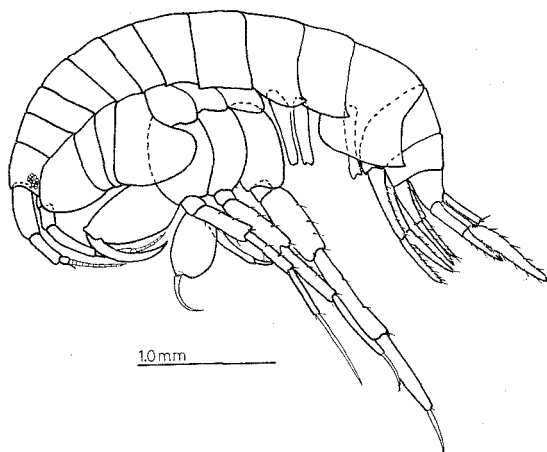


Fig. 171. *Listriella orientalis* sp. nov. Holotype, female, 4.75 mm.

Pereonites 1-5 subequal in length, pereonites 6-7 equal in length, coxae 1-4 deeper than each pereonite, largely overlapping serially. Anterior and ventral margins of pleonal epimeron 1 continuously and gently rounded, posteroventral angle slightly produced, acute; pleonal epimeron 2 produced and rounded anteroventrally, posteroventrally with 1 distinct tooth; pleonal epimeron 3 roundly produced anteriorly, roundly concave posteroventrally. Urosome subequal to pleonites 2-3 combined in dorsal length, posteroventral angle of urosome 1 extending, taper.

Antennae: Antennae about  $1/3$  as long as body length. Segments 1-2 of peduncle on antenna 1 subequal to head length, segment 3  $1/3$  as long as and narrower than segment 2, distally oblique; accessory flagellum biarticulate, equal to proximal segment of primary flagellum in length, attenuate, terminal segment small; primary flagellum 7-articulate, segment 1 as long as peduncular segment 3, with 1 spine, following segments exclusive of terminal segment with 1 aesthetasc and 1 spine, these spines apically armed with 2 setae. Segment 1 of peduncle on antenna 2 ensiform, segment 2 short, with 1 spine, gland cone stout, extending to middle of segment 3, segment 3 produced ventrodistally, with 3 upper spines, segment 4 twice as long as and narrower than segment 3, produced distally, on upper half part from base with 1 group of 2 spines and 1 seta, and 1 group of 1 spine and 2 setae, segment 5  $2/3$  as long as segment 4, not setose; flagellum 8-articulate, gradually reducing in thickness.

Mouthparts: Upper lip emarginate, asymmetrically bilobate, upper part densely setose in rows. Inner plates of lower lip completely coalescent; outer plate largely produced outward, outer oval part slightly and obliquely astride, densely

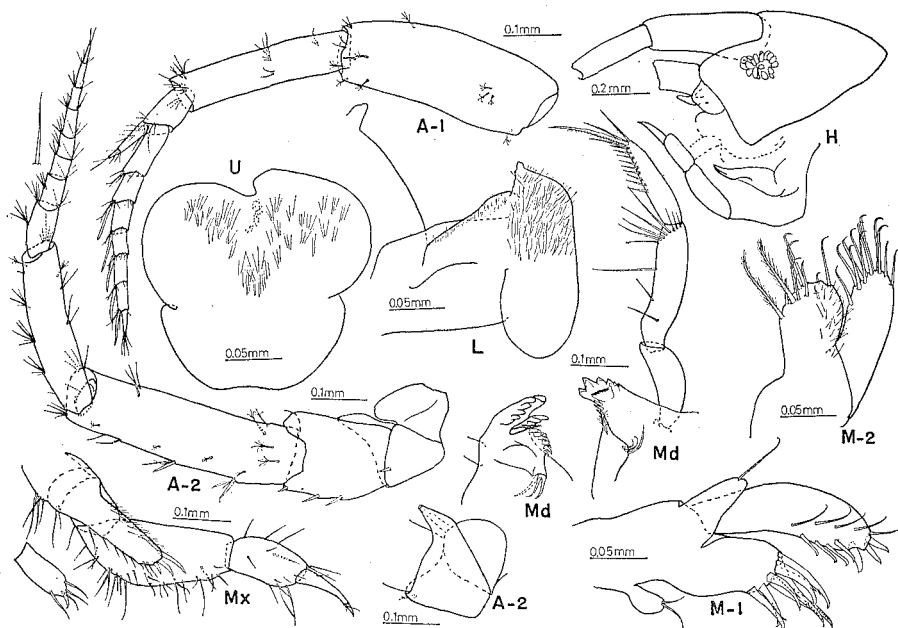


Fig. 172. *Listriella orientalis* sp. nov. Holotype, female, 4.75 mm.

pubescent on upper half part, produced forward on inner apex. Inner plate of maxilla 1 small, oval, with 2 apical setae; outer plate with 3 pectinate teeth and 4 teeth armed with 1 small teeth; palp biarticulate, extending far beyond outer plate, proximal segment short, terminal segment rounded apically, on inner half part from distal end with 1 row of 5 setae and 1 row of 4 slender and 3 stout spines. Inner plate of maxilla 2 rounded, dispersively bristly on outer margin, apex uneven, with 2 pinnate and 9 simple setae, outer plate larger than inner plate, with 12 setae. Incisor of mandible with 6 teeth, lacinia mobilis with 5 teeth on one mandible and finely serrate on the other, accessory pectinate spines 5 or 6, molar process triturtative, prominently produced, with 3 apical teeth; palp triarticulate, elongate, proximal segment slightly curved, medial segment longer than distal segment, distally with 1 oblique row of 8 setae, terminal segment with 1 row of 9 foliaceous setae on inner half part from distal end, apically blunt and with 3 slender simple and 1 longer pectinate setae. Inner plate of maxilliped small, rounded apically, with 4 setae and 1 spine; outer plate reaching middle of segment 2 of palp, with 8 inner small setae and 3 apical spines; palp 4-articulate, segment 2 as long as 2 distal segments combined, most expanded inward medially, setose on inner margin, segment 3 oval, less setose, dactyl as long as segment 3, falcate.

Gnathopod 1: Coxa 1 prominently produced forward, adequately concealing lower part of head, with 1 posteroventral minute notch. Gnathopod 1 larger than gnathopod 2. Basis slender, on anterior part of inner side with many short and small setae, posteriorly with 8 long and 2 small setae. Ischium about  $1/4$  as long as basis. Merus subequal to ischium in length, anterior free margin short, distal end free, with 1 spine and 3 small setae. Carpus subequal to merus in length, triangular, posterodistally not expanding beyond ischium. Propod as long as basis, oval, broad, gradually extending a little, densely pubescent on inner-posterior side; palm oblique, defined by 2 spines, rounded, densely spiny exclusive of proximal part. Dactyl falcate, not covering spiny part of palm.

Gnathopod 2: Coxa 2 rectangular, gradually reducing in width, posteroventrally with 1 minute notch. Basis longer than coxa 2, with 11 posterior long setae. Ischium  $1/4$  as long as basis. Merus slightly longer than ischium, anterior free margin short, distal end free, posteriorly with 5 short setae and 1 small tooth. Carpus a little shorter than ischium and merus combined, triangular, half part from base connecting with merus, posterior half margin from distal end with 2 groups of 3 or 4 small setae. Propod about  $3/4$  as long as basis, oval, anterior half margin from distal end with 3 single setae and 3 pairs of stout setae in turn, posterior inner side densely pubescent, setae formula on it 2-3-4-3-2-1, these setae pinnate on half part from distal end; palm well rounded, defined by 3 spines, spiny. Dactyl falcate, fitting on palm.

Pereopod 1: Coxa 3 similar to coxa 2. Pereopod 1 very slender. Basis  $3/4$  as long as pereopod 1, both margins with 7 short and long setae. Ischium longer than wide, posterodistal angle expanded, rounded. Merus about half as long as basis, obliquely truncate. Carpus slightly shorter and narrower than merus.

Propod as long as merus, posteriorly with 3 small setae and 1 pair of locking spines. Dactyl shorter than carpus, falcate, hooded apically.

Pereopod 2: Coxa 4 subrectangular, deeper than wide, posterior half margin from base gently concave, following margin straight, with 6 teeth. Pereopod 2 similar to pereopod 1.

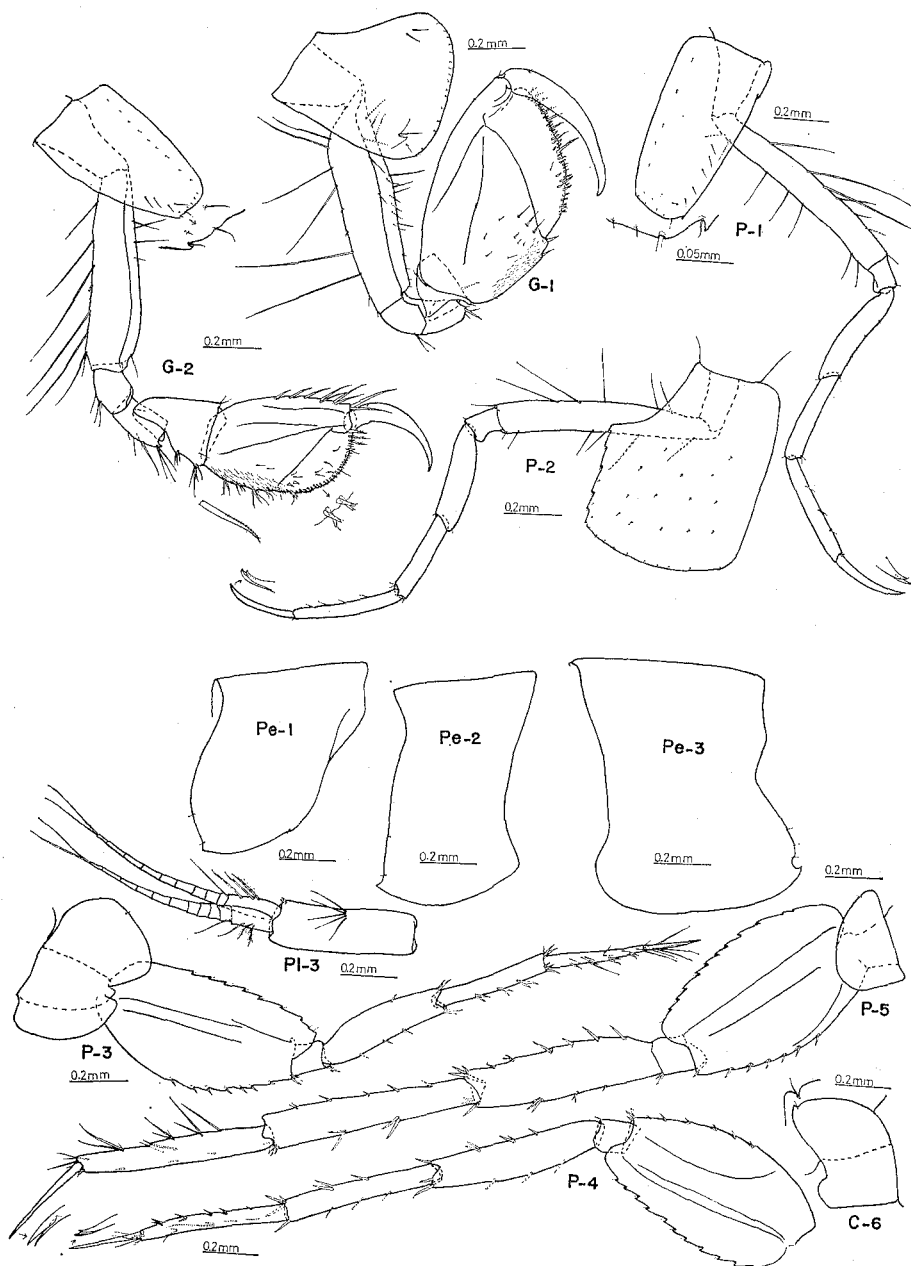


Fig. 173. *Listriella orientalis* sp. nov. Holotype, female, 4.75 mm.

Pereopod 3: Coxa 5 bilobate. Pereopod 3 equal to pereopod 2 in length. Basis about  $1/3$  as long as pereopod 3, serrate on anterior half margin from distal end, anteriorly with 7 spines and 1 distal group of 2 spines and 1 small seta, posterior thin plate slender, almost straight, with 7 teeth, not extending beyond ischium. Ischium rectangular, anterodistally with 2 spines and 1 small seta. Merus  $2/3$  as long as basis, produced on both distal ends, anteriorly with 2 single spines and 2 pairs of spines in turn, posteriorly with 1 medial spine and 1 distal pair of spines. Carpus slightly shorter and narrower than merus, anteriorly with 3 spines and 1 small seta. Propod and dactyl continuously attenuate, propod shorter than carpus, anteriorly with 2 single spines, 2 pairs of spines and 1 locking spine in formula, distal end with about 5 long setae. Dactyl about half as long as propod, styliform.

Pereopod 4: Coxa 6 bilobate, posterior lobe prominently produced backward, posterodistally with 1 notch armed with 1 minute seta. Pereopod 4 very similar to pereopod 3 in shape and size. Posterior thin plate of basis a little more expanding than one of pereopod 3.

Pereopod 5: Coxa 7 semicircular. Pereopod 5 longer than pereopod 4, but similar to it in shape. Locking spines of propod pairing.

Pleopods: Pleopods slender. Peduncle of pleopod 1 uniform in thickness,  $3/4$  as long as rami, outer margin with 1 transverse row of 5 setae and 1 pair of coupling spines; rami slender, proximal segment on outer ramus with 2 bifid and 2 ordinary pinnate setae and on inner ramus with 4 pinnate setae; terminal swimming setae about  $1/3$  as long as rami.

Uropods: Uropod 1 extending beyond uropod 2, peduncle longer than inner ramus, on outer margin with 6 spines and 1 distal group of 2 small and stout spines, on inner margin with 7 spines and 1 group of 2 spines; outer ramus slightly shorter than inner ramus, taper, with 3 pairs of spines and 1 distal spine; inner ramus truncate, inner distal end produced, with 1 outer-medial small spine, 2 apical small and stout spines, 3 inner spines and 1 distal pair of spines. Uropod 2  $2/3$  as long as uropod 1, peduncle as long as inner ramus, with 2 outer-medial and distal spines, 2 inner-medial spines and 1 inner-distal pair of spines; outer ramus slightly shorter than inner ramus, with 4 outer and 1 inner spines, apically with 1 set of 2 opposite and 1 central stout spines; inner ramus with 2 outer, 3 inner and 3 apical spines.

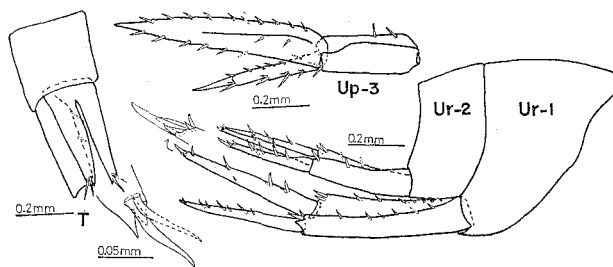


Fig. 174. *Listriella orientalis* sp. nov. Holotype, female, 4.75 mm.



Uropod 3 as long as uropod 1, peduncle half as long as inner ramus, with 2 outer-distal and 2 inner-proximal spines; outer ramus biarticulate, longer than peduncle, slender, proximal segment with 4 outer pairs of spines and 6 inner single spines, terminal segment about half as long as proximal segment, taper, naked; inner ramus foliaceous, attenuate, with 6 outer, 10 inner and 2 proximal spines.

Telson: Telson as long as peduncle of uropod 3, twice as long as proximal width, deeply cleft to near base, apex of each lobe bifid, with 1 pair of spines on concavity, inner tooth slightly extending beyond outer tooth.

Material examined. Holotype: Female, 4.75 mm. Type-locality: Ariake Sea. Date: September, 1977. Paratype: 2 specimens. Collection No.: AMBL-Amph. 49.

Remarks. The present species is clearly distinguished from the known *Listriella* spp. by the uropod 3 of which the outer ramus is  $2/3$  as long as the inner ramus.

### Lysianassidae

#### Key to the genera of Lysianassidae

- |   |   |                      |
|---|---|----------------------|
| 1 | Molar process absent .....                                      | 2                    |
|   | Molar process present .....                                     | 3                    |
| 2 | Palp of maxilla 1 absent or vestigial .....                     | <i>Prachynella</i>   |
|   | Palp of maxilla 1 present, biarticulate .....                   | <i>Aristias</i>      |
| 3 | Mandibular process placing proximally .....                     | <i>Waldeckia</i>     |
|   | Mandibular process not placing proximally .....                 | 4                    |
| 4 | Pereopod 1 stout, subchelate .....                              | <i>Ensayara</i>      |
|   | Pereopod 1 simple .....   | 5                    |
| 5 | Body prominently compressed .....                               | <i>Lepidepecreum</i> |
|   | Body not prominently compressed .....                           | 6                    |
| 6 | Palp of mandible growing out under level of molar process ..... | <i>Orchomene</i>     |
|   | Palp of mandible growing out on level of molar process .....    | 7                    |
| 7 | Molar process of mandible large, ridged .....                   | <i>Hippomedon</i>    |
|   | Molar process of mandible large, but not ridged, setose .....   | <i>Anonyx</i>        |

### *Prachynella*

*Prachynella lado* J.L. Barnard, 1964 (Oculate form sense J.L. Barnard, 1967)

(Figs 175–178)

*P. lado*: J.L. Barnard 1967b, p. 67–71.

Material examined: Female, 6.5 mm. Shijiki Bay. Collection No.: AMBL-Amph. 26. (3 specimens).

Body: Body cylindrical, slender, exoskeleton hard. Head longer than pereonite 1, rectangular in lateral view; rostrum a little produced, edged marginally, with

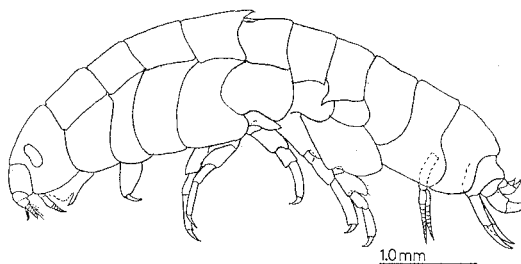


Fig. 175. *Prachynella lado* J.L. Barnard. Female, 6.5 mm.

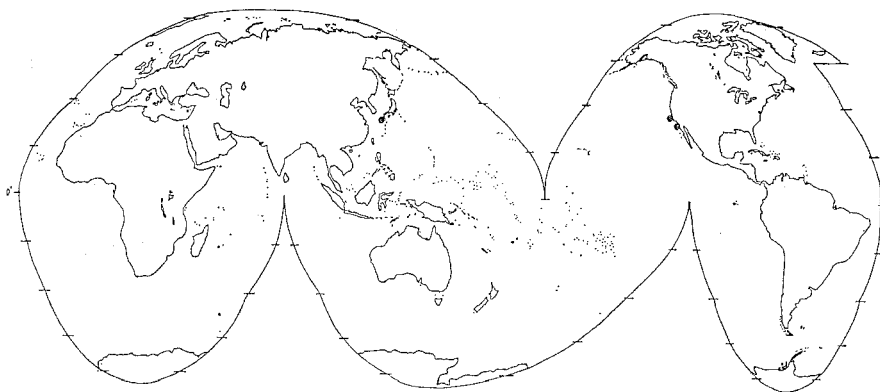


Fig. 176. Distribution of *Prachynella lado* J.L. Barnard (●) in the world.

2 pairs of opposite minute spines. Eyes small, reniform. Mouthparts depressed, the major part concealed by ventral part of head. Pereonites 1–5 longer than deep, back of pereonite 5 slightly concave anteriorly; coxae 1–4 twice as deep as each pereonite. Pleonites 1–2 equal in dorsal length, pleonite 3 longer than pleonite 2; pleonal epimeron 1 pubescent on anteroventral angle; pleonal epimeron 2 largely concave anteriorly, prominently extended forward anteroventrally, a little produced and upturned posteroventrally, posterior margin and ventral half margin from anterior angle pubescent; pleonal epimeron 3 slightly expanded backward. Urosome weakly reduced; urosomite 1 slightly depressed on middle of back, central part of posteroventral margin produced between both uropods 1, triangular, with 1 distal minute seta; urosomite 2 very short; urosomite 3 stubby, about  $\frac{1}{3}$  as long as urosomite 1 in dorsal length.

Mouthparts: Upper lip lost in dissection. Inner plate of lower lip well developed, not pubescent; shoulders produced, pubescent, with 1 apical spine, mandibular process vestigial. Inner plate of maxilla 1 small, long oval, apically with 1 small seta and 2 unarticulate teeth; outer plate slender, slightly bent distally, apically with 7 stout and conical teeth of which 6 are armed with 1 to 3 teeth and of which the other is small and simple; palp growing out at medial level of outer plate, vestigial. Inner plate of maxilla 2 shorter than outer plate, truncate, with 1 distal and 2 apical setae; outer plate with 1 distal and 6 apical setae. Mandible

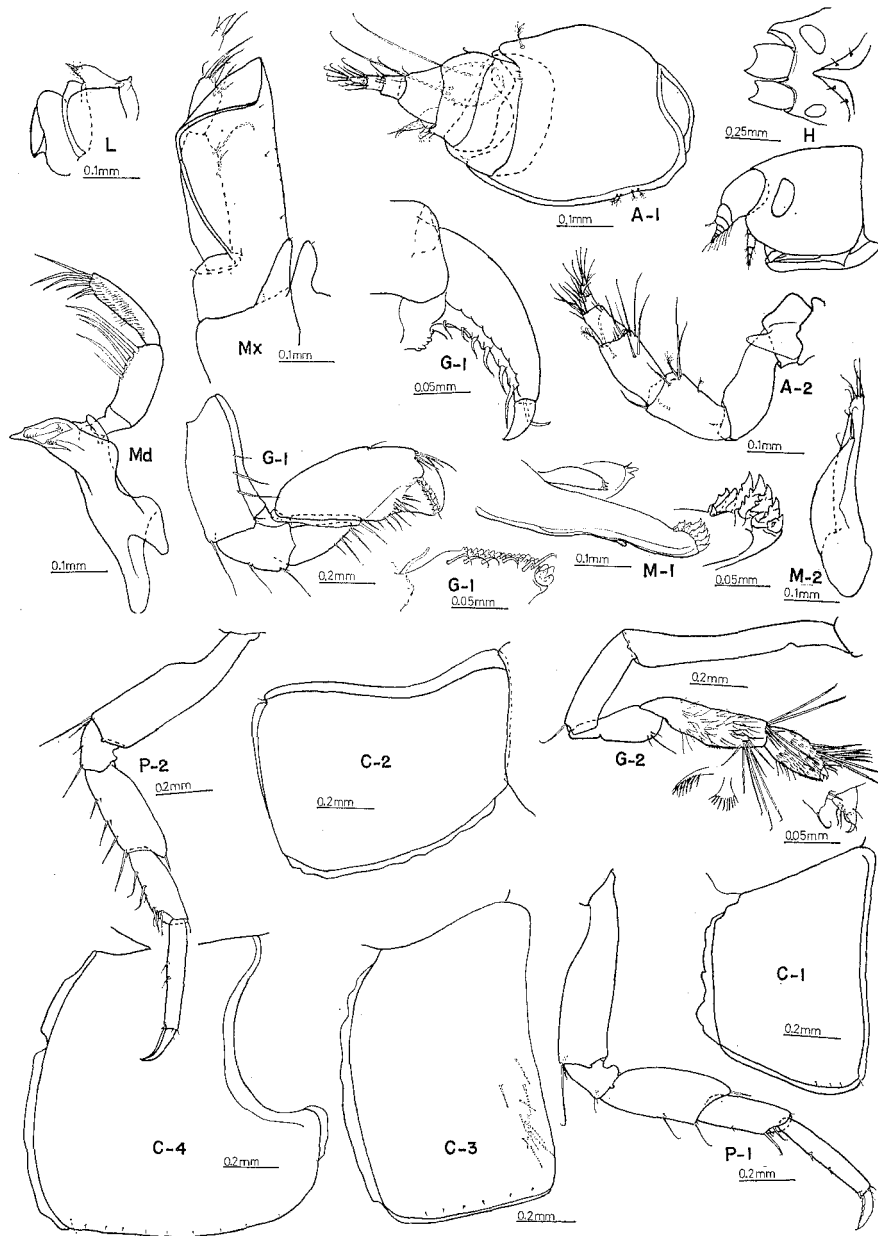


Fig. 177. *Prachynella lado* J.L. Barnard. Female, 6.5 mm.

lacking molar process; incisor remarkably produced forward, broad, chisel-like; lacinia mobilis vestigial, consisting of 3 small teeth; palp growing out at upper level of mandible, triarticulate, proximal segment small, trapezium, middle segment stout, inner half part from distal end with 5 long stout setae which gradually elongate, terminal segment as long as and slenderer than middle segment, pubescent

in rows on inner margin, apex diagonal, with 6 stout and acute setae which gradually elongate. Inner plate of maxilliped very small, apex rounded, with 1 small seta; outer plate much developed, broad, inner margin with several small setae, apex and outer margin rounded; palp triarticulate, slender, not extending beyond outer plate, proximal segment longer than half of palp, with 4 inner-distal setae, middle segment shorter than half of proximal segment, with several distal setae, dactyl falcate, nail-like, with 2 distal setae.

Antennae: Antennae very short, equal in length. Antenna 1 shorter and narrower than half as deep as head, rugger-ball-like; segment 1 of peduncle about half as long as antenna 1, prominently swollen, upper distal end reaching middle of segment 2, segment 2 broader than long, upper margin produced beyond middle of segment 3, segment 3 broader than long, upper distal end a little produced upward, receiving accessory flagellum, with several small pinnate setae, ventral margin setose in circle, these setae very long; accessory flagellum biarticulate, proximal segment stubby, with 1 small pinnate seta and 1 long stout spine, terminal segment slender, with 3 or 4 apical small setae; primary flagellum 4-articulate, gradually reduced in length, segment 1 very stout, terminal segment apically with many setae. On peduncle of antenna 2, gland cone stout, segment 3 the longest, diagonally truncate, segment 4 geniculating to preceding segment, segment 5 upper-distally with 2 small pinnate and 1 simple setae; flagellum 4-articulate, progressively reducing in length, setose on distal end, segment 1 longer than remainders combined.

Gnathopod 1: Coxa 1 rectangular, posteroventrally with 1 small notch armed with 1 minute seta. Gnathopod 1 subchelate, stout, short. Basis about  $2/5$  as long as gnathopod 1, anteriorly with 3 setae growing longer and 2 distal small setae. Ischium about half as long as basis. Merus triangular, posterior margin roundish, as long as one of ischium, with 5 needle-like spines on half margin from distal end. Carpus laminal, diagonally placed between merus and propod, extending anteriorly and fitting on anterior concavity of ischium, posterodistally with 2 needle-like spines. Propod very much developed, subtriangular, transitional part between muscular part and palmar thin plate gradually reducing in thickness, with 2 rows of 3 and 4 spines, anterior half margin from base with 6 spines, palmar thin plate triangular; palm diagonally produced forward, complicately pectinate, with 4 distal conical teeth and 1 proximal seta, else with 6 marginal setae distally curved. Dactyl stout, falcate, reaching distal teeth of palm, consisting of two parts, grasping margin of proximal part undulated, with 6 marginal and 1 distal setae, terminal part nail-like, acute.

Gnathopod 2: Coxa 2 rectangular, with 1 posteroventral small notch armed with 1 minute seta. Gnathopod 2 feeble, elongate, minutely subchelate. Basis shorter than half of gnathopod 2, a little widening distally. Ischium half as long as basis, uniform in width, extended both distally, with 1 posterodistal seta. Merus a little shorter than ischium, growing broader, diagonal distally, with 3 posterodistal setae. Carpus longer than ischium,  $1/3$  part from base growing broader, remainder part densely bristly, posterior half part from distal end pectinate,

remainder densely bristly, posterior half part from distal end pectinate, with 13 medial long spines in rows and 7 anterodistal long and short spines. Propod oval, 2/3 part from distal end bristly in rows, a little produced posterodistally, posterior half part from distal end pectinate, with 1 apical seta, anterior half part from distal end with about 13 pectinate setae in rows; palm very short, with 1 proximal spine. Dactyl small, stout, consisting of two parts, proximal part stout, grasping margin with 3 setae, distal part nail-like, acute.

Pereopod 1: Coxa 3 similar to coxa 2, but lacking posteroventral notch. Basis about 1/3 as long as pereopod 1, compressed proximally. Merus longer than half as long as basis, extending anterodistally, with 1 anterodistal spine. Carpus shorter and narrower than merus, uniform in width, a little produced and forming shallow pocket on anterior half part of distal end, posteriorly with 1 medial small seta, and 2 spines and 2 small setae on distal end. Propod longer than merus, about half as broad as carpus, posteriorly with 2 medial spines and 1 distal locking spine. Dactyl falcate.

Pereopod 2: Coxa 4 the widest in coxae, boot-like, upper 2/3 part of posterior margin deeply curved, remainder produced backward. Pereopod 2 similar to pereopod 1. Merus posteriorly with 2 pairs of 2 short and minute setae, 1 short seta and 1 distal set of 2 short and minute setae. Carpus with 2 posteromedial short and minute setae and 4 posterodistal spines.

Pereopod 3: Coxa 3 bilobate, about half as deep as coxa 4, both lobes subequal in length, rounded. Basis about 1/3 as long as pereopod, round, anterior half part from distal end with 5 long setae, posterior thin plate broadly expanded in circle and extending to middle of merus, with 3 medial small notches. Ischium broader than long, anteriorly pubescent, with 1 anterodistal seta. Merus shorter than basis, steeply expanding posteroproximally, posterodistally extending to middle of carpus, anterodistally producing to 1/3 length of carpus on inner side, its process apically with 1 spine and 1 long seta, anterior margin pubescent, with 2 rows of 5 small and 4 short setae, posterior margin with 1 spine and 1 distal group of 1 spine and 1 minute seta. Carpus about 2/3 as long as anterior margin of merus, gradually widening to twice as wide as proximal part, posteriorly rounded and with 1 distal minute seta, having 1 anteromedial notch with 1 group of 1 spine and 1 short seta, anterodistally with 1 group of 1 spine and 1 long seta. Propod as long as anterior margin of merus, almost uniform in width, about half as broad as distal end of carpus, anteriorly with 1 medial spine and 1 distal locking spine, posterodistally with 1 small seta and 3 stiff spines of which distal half part is slenderer than proximal half. Dactyl stout, nail-like.

Pereopod 4: Coxa 6 bilobate, posterior lobe with 1 posteroventral small notch armed with 1 minute seta. Pereopod 4 very similar to pereopod 3 in shape. Basis pubescent on half part from distal end, on anterior half margin from distal end with 4 spines, posteromedially with 4 minute setae on each notch. Ischium anterodistally with 1 spine and 1 minute seta, anterior half part of outer side pubescent. Merus broadly expanding backward and extending to near middle of carpus,

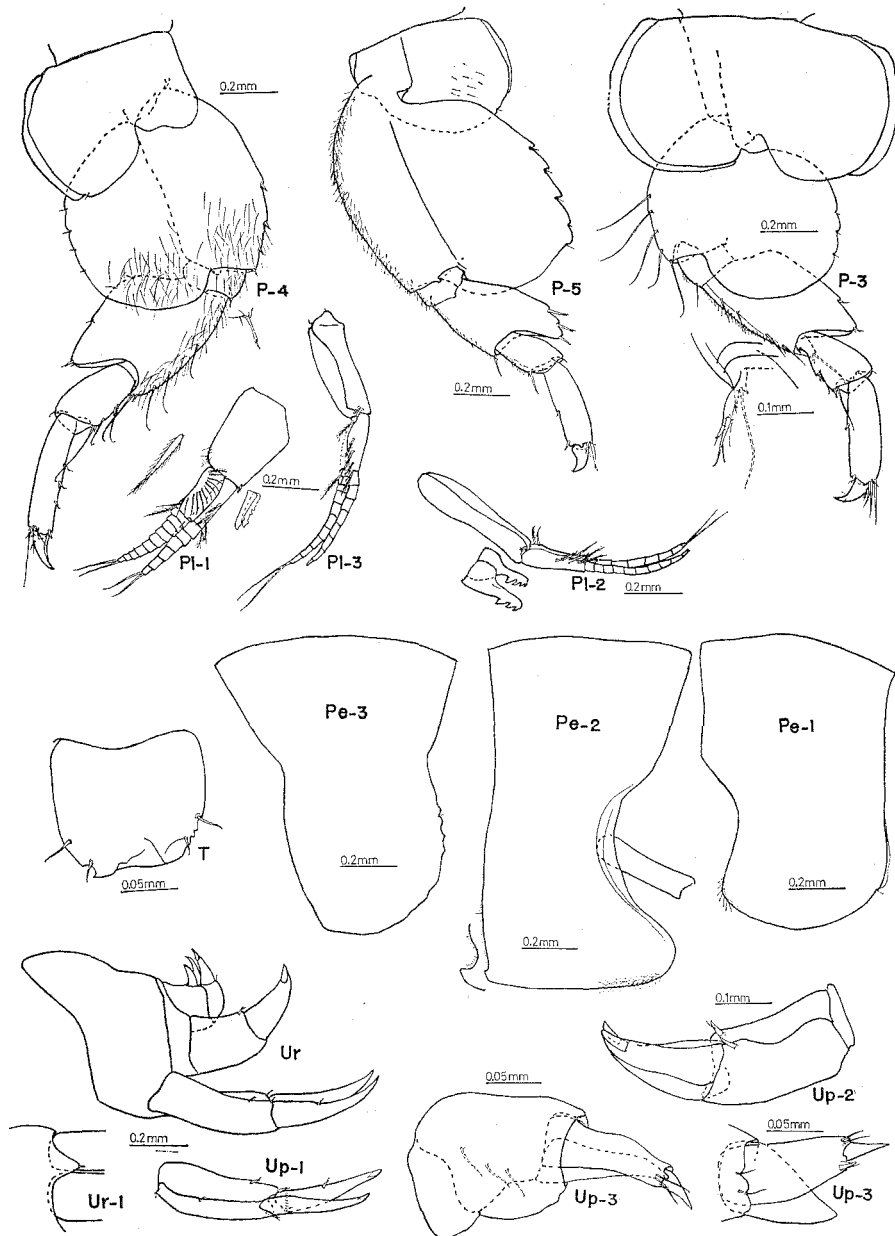


Fig. 178. *Prachynella lado* J.L. Barnard. Female, 6.5 mm.

anterodistal extension with 1 spine and 1 seta. Carpus anteriorly with 2 groups of 1 spine and 1 short seta, and 1 medial seta. Propod anteriorly with 3 medial spines and 1 distal locking spine.

Pereopod 5: Coxa 7 gradually expanding backward, posterodistally with 1 small notch armed with 1 minute seta. Pereopod 5 equal to pereopod 4 in length.

Basis about half as long as pereopod 5, anteriorly hairy and with 4 spines and 3 small setae, posterior thin plate very much expanding backward and downward, transverse distally, marginally serrate in five. Anterior margin of merus shorter than half as long as one of basis, a little produced distally, hairy, with 1 distal group of 2 small and long spines, posterior margin gradually expanding to twice as broad as proximal part, extending to proximal  $2/3$  part of carpus, on  $1/3$  part from distal end with 3 spines. Carpus  $2/3$  as long as anterior margin of merus, gradually widening a little, distally produced to form wall, anteriorly hairy and with 1 medial minute spine and 1 distal group of 1 minute and 1 slender spines. Propod subequal to anterior margin of merus and carpus combined in length, anteriorly with 1 medial spine and 1 distal locking spine, posterodistally with 2 spines and 1 minute seta. Dactyl small, stout, nail-like.

Pleopods: Pleopods similar, peduncle stout, but one of pleopods 2-3 longer than one of pleopod 1; both rami stout, proximal segment of outer ramus with 2 bifid and 2 ordinary pinnate setae, one of inner ramus with 13 or 14 pinnate setae; terminal swimming setae about  $1/3$  as long as rami.

Uropods: Uropods stubby. Uropod 1 extended beyond uropod 2; peduncle longer than rami, outer half margin from distal end with 1 medial spine and 1 distal pair of spines, inner margin with 1 proximal spine and 2 distal spines of which one grows out on ventral side; both rami equal in length, taper, with 1 distal nail, outer ramus with 1 outer medial spine. Uropod 2 longer than half of uropod 1, stout, both upper lateral margins of peduncle with 1 apicodistal spine, ventrodistally with many minute setae; both rami equal in length, with 1 apical nail. Uropod 3 subequal to half of uropod 2 in length, stout; peduncle stubby, ventrally roundish and with 3 inner medial setae, distal margin produced, supporting rami, with 2 ventrodistal setae; outer ramus biarticulate, proximal segment stout, with 2 outer distal setae and 1 inner distal spine, terminal segment conical; inner ramus a little shorter than proximal segment of outer ramus, triangular, without any spine and any seta.

Telson: Telson square, subequal to peduncle of uropod 3 in length, both lateral sides with 2 setae.

*Remarks.* The present specimens well agree with the oculate form of *Prachynella lado* J.L. Barnard (1967b), but the following differences is found. In Californian specimens, the defining corner on the palm of gnathopod 1 in the oculate type lacks the tooth. However, the present specimens have the defining corner with 4 teeth.

#### *Aristias*

#### *Aristias nonspinus* sp. nov.

(Figs 179-181)

Body: Body rather depressed, small. Head short, anterior head lobe well developed, produced beyond peduncular segment 1 of antenna 1. Eyes medium,

circular. Pereon growing deeper, coxae 1-4 shallower than each pereonite, growing deeper, about half part of coxa 1 concealed by coxa 2. Each pleonite broader than pereonite 7, subequal in length; pleonal epimera 1-2 rectangular, pleonal epimeron 2 with 1 posteroventral acute tooth; pleonal epimeron 3 as broad as pleonal epimeron 2, posteriorly sinuous, posteroventrally with 1 small blunt tooth. Urosome subequal to pleonite 3 in length, gradually reducing in size, back of urosomite 1 slightly concave.

Antennae: Antennae 1-2 about 1/4 as long as body length. Antenna 1 longer than antenna 2, rather stubby, gradually reducing in size; segment 1 of peduncle about 1/3 as long as antenna 1, broader, segments 2-3 rectangular, gradually reducing in size; accessory flagellum biarticulate, not extended beyond proximal segment of primary flagellum, proximal segment stubby, terminal segment 1/3 as long as proximal segment, with 4 apical setae; primary flagellum 4-articulate, segment 1 as long as peduncular segment 2, with 1 proximal oblique row of 7 aesthe-

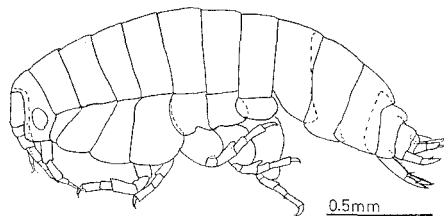


Fig. 179. *Aristias nonspinus* sp. nov. Holotype, male, 2.25 mm.

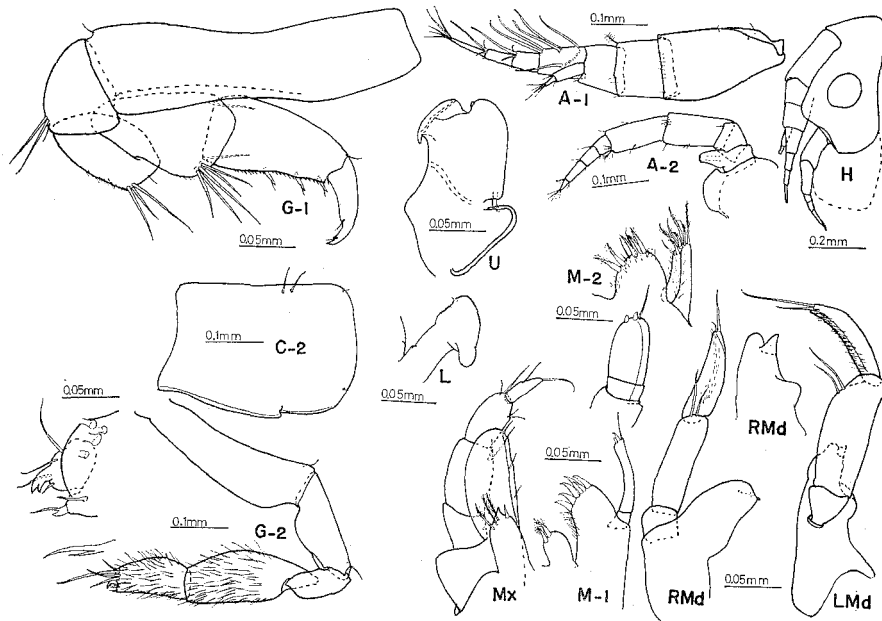


Fig. 180. *Aristias nonspinus* sp. nov. Holotype, male, 2.25 mm.



tascs and 1 distal pair of aesthetascs, following segments gradually elongate, segments 3-4 with 1 distal group of 2 short and long aesthetascs. Antenna 2 rather feeble; gland cone of peduncular segment 2 much developed, extended beyond segment 3, segment 3 short, square, segment 4 longer than twice as long as segment 3, segment 5 as long as and slightly narrower than segment 4; flagellum 4-articulate, dispersively setose.

**Mouthparts:** Upper lip distinctly produced, tritulative and smooth distally, epistome producing near middle of upper lip, blunt. Inner plate of lower lip obsolescent; outer plate long, dilating on half part from distal end, shoulders broad, with 1 small tooth, mandibular process small, rounded distally. Inner plate of maxilla 1 medium, with 2 stout pinnate setae; outer plate with 6 smooth and stout tooth-like spines, densely pubescent inner-distally; palp biarticulate, broad, proximal segment short, apex of distal segment rounded, with 2 conical teeth and 1 seta. Both plates of maxilla 2 broadly separated; inner plate semicircular, broad, pubescent, with 5 stout densely pinnate and 3 short simple setae; outer plate rather narrower, pubescent, apically with 8 pinnate setae. Mandible aberrant, lacking lacinia mobilis and accessory blades; incisor not distinctly projected, narrow, bifid, one lobe rounded, the other acute; molar process vestigial, broadly swollen; palp triarticulate, well developed, rather broad, growing out at level with molar process, proximal segment short, trapezoid, segment 2 about half as long as palp, broad, with 2 distal setae, distal segment gently curved, taper, densely pubescent on inner margin, with 2 apical simple setae. Maxilliped small; inner plate medium, with 1 tooth and 3 pinnate setae near apex; outer plate reaching middle of palpal segment 3, with 4 inner small setae; palp 4-articulate, rather slender, less setose, segment 3 shorter than segment 2, dactyl  $2/3$  as long as segment 3, truncate, with 1 outer-medial and 1 apical long setae.

**Gnathopod 1:** Gnathopod 1 simple, normal. Basis shorter than half as long as gnathopod 1, uniform in width. Ischium short, posterior margin rounded, 3 times of anterior margin, distally with 2 stiff and 1 small setae. Merus  $1/3$  as long as basis, distally free and with 3 posterior stiff setae, inner distal submargin densely and finely bristly. Carpus growing narrower, produced outer-distally, inner side densely bristly, anterodistally with 1 stiff seta, posterodistally surrounded by 6 stiff setae. Propod subequal to half as long as basis, gradually decreasing in width, posteroproximal margin smooth, following margin distinctly serrate, posterior half margin from distal end with 3 spines. Dactyl falcate, stout.

**Gnathopod 2:** Coxa 2 rectangular. Gnathopod 2 minutely subchelate. Basis  $1/3$  as long as gnathopod 2, slightly sinuous. Ischium longer than half as long as basis, slightly expanded anteromedially. Merus geniculating to ischium,  $2/3$  as long as basis, densely bristly on  $2/3$  part from distal end. Propod longer than half as long as carpus, nearly rectangular, gently expanding anteromedially, densely bristly, slightly produced posterodistally, on its apex with 1 small and stout spine, anterodistally with 4 stout bifid setae; palm very short, transverse, with 1 stout seta. Dactyl small, composing of 2 parts, proximal part stout, with 4 distal

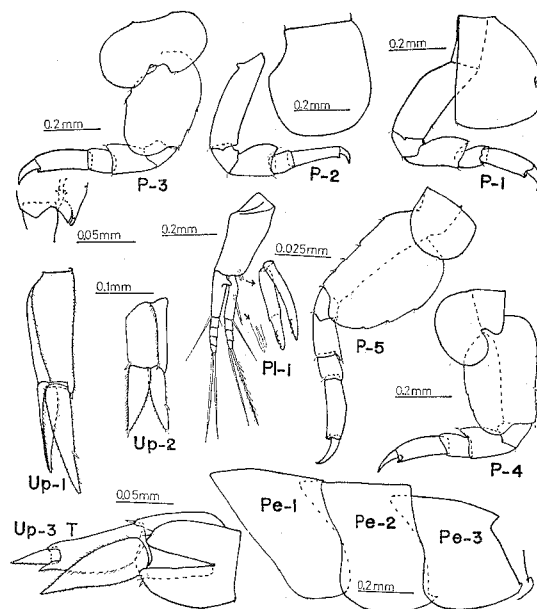


Fig. 181. *Aristias nonspinus* sp. nov. Holotype, male, 2.25 mm.

setae, distal part nail-like, small, bifid.

Pereopod 1: Coxa 3 as large as coxa 2, anterior margin gradually expanding forward. Basis  $2/5$  as long as pereopod 1. Posterior margin of ischium  $1/3$  as long as basis, with 1 distal minute seta. Merus about half as long as basis, gradually expanding on anterior half margin from base, produced anterodistally. Carpus half as long as merus. Propod as long as and narrower than carpus, uniform in width, posterodistally free. Dactyl falcate, short.

Pereopod 2: Coxa 4 rectangular, but roundish, anteroproximal margin gently concave. Pereopod 2 similar to pereopod 1.

Pereopod 3: Coxa 5 broad, bilobate, divided by broad concavity, both lobes equal in size. Basis  $2/3$  as long as pereopod 3, with 3 anterior spines, posterior thin plate as broad as anterior muscular part, produced distally, proximally with a few minute teeth. From ischium to dactyl very similar to these of pereopod 2 except for posterodistal end of merus notched.

Pereopod 4: Coxa 6 bilobate, divided by steep concavity, posterior lobe twice as broad as anterior lobe. Pereopod 4 similar to pereopod 3 except for basis with 4 anterior spines.

Pereopod 5: Coxa 7 semicircular, subequal to coxa 6 in size. Pereopod 5 very similar to pereopod 4 except for the following points; basis slenderer, most expanded proximally, anteriorly with 5 small spines, merus with 1 spine on posterodistal extension and 1 anterodistal spine, and carpus anterodistally with 1 spine.

Pleopods: Pleopods weakly developed, short. Peduncle of pleopod 1 stout, longer than rami, coupling spines not hook-like; outer ramus 5-articulate, proximal

segment longer than following segments combined; inner ramus 4-articulate, proximal segment as long as one of outer ramus, with 1 medial bifid seta; terminal swimming setae as long as peduncle.

Uropods: Uropod 1 not extended beyond uropod 2; peduncle as long as inner ramus, inner-distally produced and with 1 spine, finely pectinate marginally; both rami foliaceous, taper, equal in length, pectinate marginally, inner ramus with 1 inner medial spine. Uropod 2 not extended beyond uropod 3, subequal to half as long as uropod 1; peduncle equal to rami in length, pectinate marginally, both apices with 1 spine; rami foliaceous, taper, equal in length, pectinate marginally, with 1 apical spine, else outer ramus with 1 outer-medial spine. Uropod 3 slightly shorter than uropod 2, peduncle shorter than inner ramus, produced on outer distal end, both distal ends with 1 spine; outer ramus biarticulate, longer than inner ramus, pectinate inner-marginally, proximal segment produced both distally, especially inner-distal extension prominent, distal segment about half as long as proximal segment; inner ramus foliaceous, taper, longer than proximal segment of outer ramus, pectinate marginally.

Telson: Telson as long as peduncle of uropod 3, cleft near base, rounded marginally, apices with 1 pair of small setae.

Material examined. Holotype: Male, 2.25 mm. Type-locality: Tomioka Bay. Date: May, 1978. Paratype: 2 specimens. Collection No.: AMBL-Amph. 87.

*Remarks.* The present species is very similar to *Artistias madagascarensis* Ledoyer, 1972 (Ledoyer 1972) in the telson lacking spines and deeply cleft, but is clearly distinguished from it by the following points; (1) gnathopod 2 slender and carpus and propod almost uniform in width, (2) pleonal epimeron 2 lacking posterodistal distinct tooth and (3) palp of maxilla 1 serrate apically.

### *Waldeckia*

#### *Waldeckia elephas* Hirayama et Kikuchi, 1980

*W. elephas*: Hirayama & Kikuchi 1980, p. 145–151.

Material examined: Tomioka Bay.

### *Ensayara*

#### *Ensayara dentarius* sp. nov.

(Figs 182–184)

Body: Body small, chubby, coxae 1–4 developed, growing deeper. Head shorter than pereonite 1, anterior head lobe triangular, remarkably produced, but not extended beyond peduncular segment 1 of antenna 1. Eyes relatively large, oval, central part dark in alcohol. Pereonite 1 the longest. Pleonites subequal

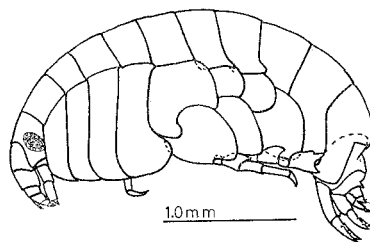


Fig. 182. *Ensayara dentarius* sp. nov.  
Holotype, male, 4.0 mm.

in length; pleonal epimera 1–3 rectangular, pleonal epimeron 3 gradually widening a little, anteroventrally with 1 small notch. Urosome subequal to pleonite 3 in length, back of urosomite 1 slightly concave posteriorly.

Antennae: Antennae very short, stubby. Peduncular segment 1 of antenna 1 well developed, half part from base on segment 2 concealed under segment 1, segment 2 remarkably extended forward on outer side and slightly extended beyond segment 3 ventrally, half part from base on inner side of segment 3 with many aesthetascs; accessory flagellum triarticulate, extended beyond segment 1 of primary flagellum, 2 distal segments very small; primary flagellum  $1/3$  as long as peduncle, 5-articulate, gradually reducing, 3 proximal segments distally with 1 aesthetasc. Antenna 2 about half as thick as and as long as antenna 1; gland cone of peduncular segment 2 small, segment 4 about twice as long as segment 3, segment 5 slightly shorter and narrower than segment 4; flagellum triarticulate, segments rapidly reducing in size.

Mouthparts: Epistome not produced beyond upper lip, broad distally, upper lip distinctly produced. Lower lip lacking inner plate, broad between both outer plates, shoulders broad, hairy, mandibular process medium, held inward. Inner plate of maxilla 1 medium, triangular, hairy, with 1 apical seta pinnated on distal half part; outer plate with 9 tooth-like spines serrated on one side, palpal hump developed; palp biarticulate, extended far beyond outer plate, bent distally, apex with 7 conical teeth. Inner plate of maxilla 2 narrow, not reduced, with 5 simple stiff setae; apex of outer plate with 7 stout and pectinate tooth-like spines and 3 slender setae on inner side, and 4 slender setae on outer side. Mandible lacking lacinia mobilis, incisor developed, smooth, with 2 distal opposite teeth, accessory simple spines 3, molar process medium, distinctly produced, densely pubescent, dorsal spatulate plate developed, palpal hump distinctly produced, placed on level with molar process; palp triarticulate, almost uniform in thickness, very elongate, proximal segment short, compressed proximally, medial segment half as long as palp, inner-distally with 4 long simple setae, terminal segment most expanded at  $1/3$  from base, bristly in rows, with 7 short and 4 apical setae on inner  $2/3$  part from distal end. Maxilliped medium; inner plate reaching middle of palp segment 2, apically with 4 conical teeth and 2 stout setae; outer plate extended beyond segment 2 of palp, with 7 inner-distal small conical teeth, else inner submargin with

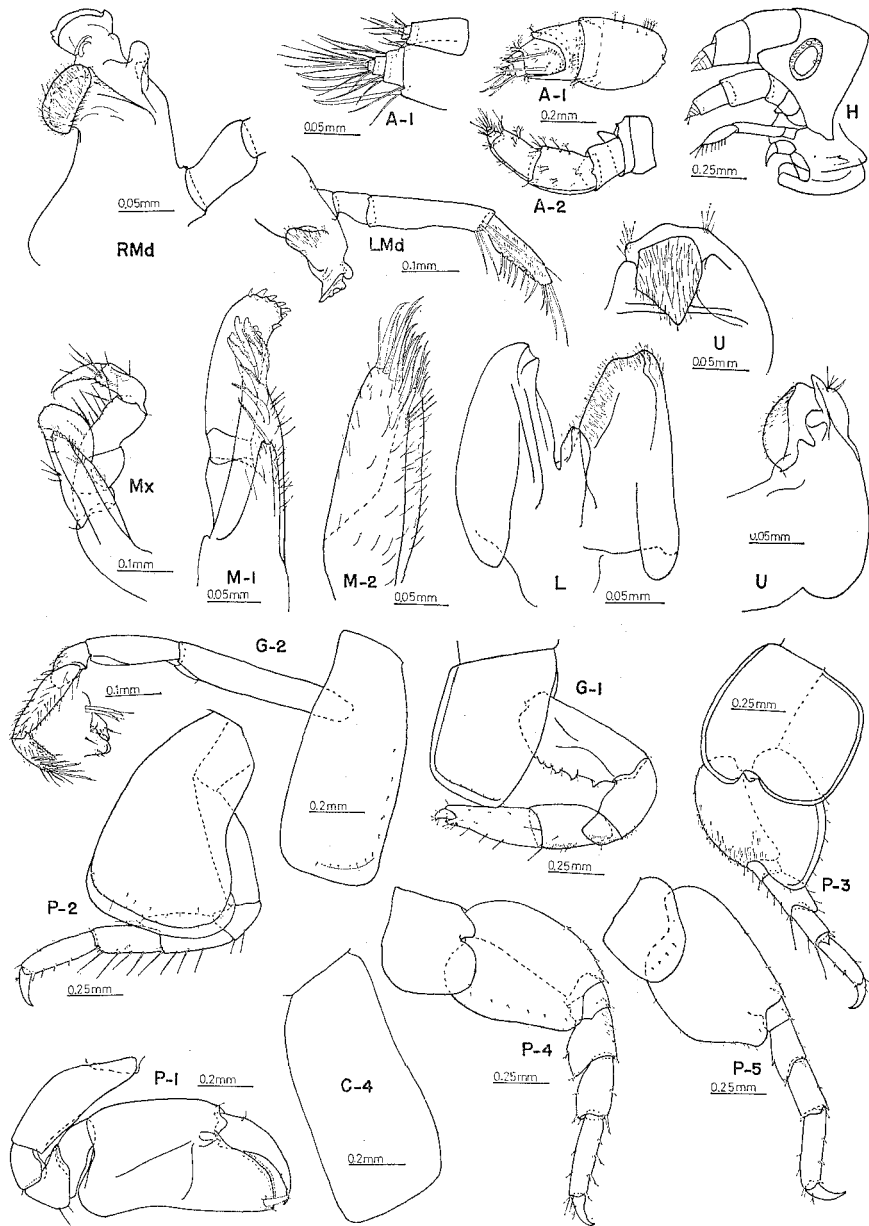


Fig. 183. *Ensayara dentarius* sp. nov. Holotype, male, 4.0 mm.

3 small setae; palp 4-articulate, half part from distal end on segment 3 bristly in rows and with several setae in rows, dactyl claw-like, as long as segment 3, with nail, bristly inner-marginally.

Gnathopod 1: Coxa 1 rectangular,  $3/2$  as deep as wide. Gnathopod 1 simple, stout. Basis  $1/3$  as long as gnathopod 1, anterior margin gently expanded, with

6 upturned teeth. Posterior margin of ischium  $2/3$  as long as basis, densely pubescent distally. Merus small, scale-like, densely pubescent posteriorly. Carpus as long as ischium, pubescent on posterior half margin from distal end. Propod shorter than basis, gradually narrowing, with 3 small and 3 distal setae. Dactyl short, stout, nail-like.

Gnathopod 2: Coxa 2 rectangular,  $3/2$  as deep as coxa 1. Gnathopod 2 slender, long, uniform in width, minutely subchelate. Basis shorter than coxa 2. Ischium about half as long as basis. Merus bristly on anterior half part from distal end, posterior margin short. Carpus as long as ischium, densely bristly, posteriorly with 8 small spines and 1 distal seta. Propod half as long as carpus, densely bristly, produced beyond dactyl, superpectinate posteriorly, on anterior half part from distal end with 1 row of 3 single spines and 1 distal pair of spines, else with several setae in longitudinal rows. Dactyl small, nail-like, with 2 medial setae.

Pereopod 1: Coxa 3 similar to coxa 2. Pereopod 1 stout, chelate. Ischium  $1/3$  as long as basis. Merus almost as long as ischium, triangular, distal width attaining to  $3/2$  as broad as long, with 2 posterodistal setae. Carpus growing narrower, posterior margin oblique, receiving propod. Propod about  $1/3$  as long as and as broad as coxa 3, rectangular, basal part producing backward, free on posterior  $2/3$  part, posterior part prominently extended forward in about  $1/3$ , distally with 1 large and 1 small spines; palm splaying, rounded, with 13 small spines of which apex is like nailhead. Dactyl stout, falcate, fitting on palm in closed.

Pereopod 2: Coxa 4 subequal to coxa 3 in depth, expanding backward on posterior half part from ventral angle. Basis  $1/3$  as long as pereopod 2. Posterior margin of merus  $2/3$  as long as basis, with 4 single setae, anterodistal extension prominent, with 1 apical seta. Carpus as long as and narrower than merus, posteriorly with 4 single short setae. Propod longer and narrower than carpus, posteriorly with 3 slender spines and 1 stout locking spine. Dactyl half as long as propod, falcate.

Pereopod 3: Coxa 5 bilobate, as broad as deep, anterior lobe half as broad as and slightly deeper than posterior lobe. Basis oval, but distorted, most expanded proximally, anteriorly with 11 small spines, pubescent on anterior  $2/3$  part from distal end, posterior thin plate extending to middle of merus. Ischium twice as broad as long, with 1 distal group of 1 small spine and 1 small seta. Merus about twice as long as ischium, most expanded posteromedially, produced both distally, anteriorly with 3 medial short setae and 1 distal group of 1 spine and 2 small and short setae. Carpus a little shorter than merus, anterodistally with 2 small spines and 1 short seta. Propod as long as ischium and merus combined, anteriorly with 1 single spine, 2 pairs of spines and 1 locking spine in formula. Dactyl about half as long as propod, falcate.

Pereopod 4: Coxa 6 similar to coxa 5, but distinctly smaller. Basis nearly oval, broadly expanded, anteriorly with 6 small spines, posterior thin plate not or slightly extended beyond ischium. Ischium twice as broad as long, with 1 anterodistal spine. Anterior margin of merus  $1/3$  as long as basis, dispersively bristly,

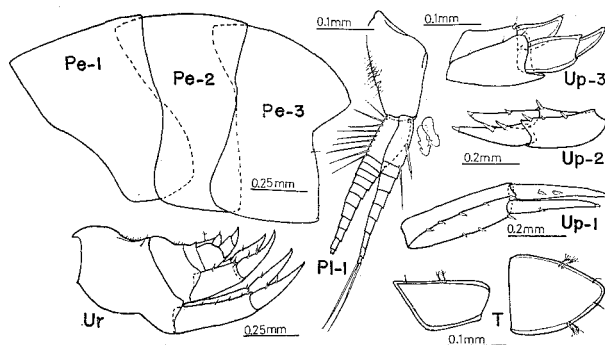


Fig. 184. *Ensayara dentarius* sp. nov. Holotype, male, 4.0 mm.

with 2 medial small setae and 1 distal spine, posterior margin expanded and extended, with 2 medial and apical spines. Carpus as long as anterior margin of merus, anteriorly with 1 medial spine and 1 distal group of 2 small and longer spines, posteriorly with 1 medial small spine and 1 group of 1 spine and 1 small seta. Propod longer than ischium and merus combined, anteriorly with 1 spine, 2 pairs of spines and 1 locking spine. Dactyl shorter than half as long as propod, nail-like.

Pereopod 5: Coxa 7 smaller than coxa 6. Basis as long as one of pereopod 4, most expanded backward medially, anterior 1/3 margin from distal end with 3 spines, posterior thin plate not or slightly extended beyond ischium. Ischium slightly broader than long, with 1 anterodistal spine. Merus similar to one of pereopod 4, but slenderer. Carpus similar to one of pereopod 4, but lacking 1 posterodistal spine. Propod longer than ischium and merus combined, anteriorly with 1 single spine, 1 pair of spines and 1 locking spine. Dactyl about half as long as propod, nail-like.

Pleopods: Peduncle of pleopod 1 stout, most expanded basally, 2/3 as long as rami; proximal segment on outer ramus with 9 single setae and on inner ramus with 1 bifid and 1 simple setae; terminal swimming setae about half as long as rami.

Uropods: Uropods shortened, stout. Uropod 1 not extended beyond uropod 2, peduncle longer than outer ramus, with 5 outer and 3 inner spines; rami attenuate, each with 1 apical cone, outer ramus slightly longer than inner ramus, with 2 medial spines, inner ramus with 1 medial spine. Peduncle of uropod 2 as long as rami, with 3 outer and 1 inner spines; rami attenuate, each with 1 apical cone, outer ramus with 2 medial spines, inner ramus with 1 medial spine. Uropod 3 small, peduncle as long as outer ramus, distinctly produced ventrodistally, with 3 outer small setae and 1 inner distal spine; rami with marginal fringe, flattened, attenuate, outer ramus biarticulate, terminal segment about half as long as proximal segment, inner ramus as long as proximal segment of outer ramus, foliaceous.

Telson: Telson fleshy, upper margin even, semioval, lateral margin with 1 medial pair of distally pinnate setae and 1 distal small simple seta.

Material examined. Holotype: Male, 4.0 mm. Type-locality: Tomioka Bay. Date: May, 1978. Paratype: 3 specimens. Collection No.: AMBL-Amph. 88.

*Remarks.* The new species clearly differs from the known two species, *Ensayara ramonella* J.L. Barnard 1974 (J.L. Barnard 1974) and *E. carpinei* Bellan-Santini, 1974 (Bellan-Santini 1974), in the anterior margin of basis on the gnathopod 1 not serrate and the inner plate of maxilla 2 reduced in size.

*Lepidepereum*

***Lepidepereum vitjazi* Gurjanova, 1962**

(Figs 185–188)

*L. vitjazi*: Gurjanova 1962, p. 338–340; Nagata 1965a, p. 145–146.

Material examined: Female, 6.25 mm. Ariake Sea, Tomioka Bay, Shijiki Bay. Collection No.: AMBL-Amph. 58. (8 specimens).

Body: Body robust, much compressed. Dorsal length of head as long as pereonite 1, twice as deep as dorsal length, anterior head lobe produced in triangle, stout, reaching apex of peduncular segment 1 of antenna 1. Eyes very large, oval. Coxae 1–3 well developed, growing deeper. Pleonal epimera pubescent anteriorly and ventrally; pleonal epimeron 1 rounded; pleonal epimeron 2 rounded antero-ventrally and straight posteriorly; pleonal epimeron 3 similar to pleonal epimeron

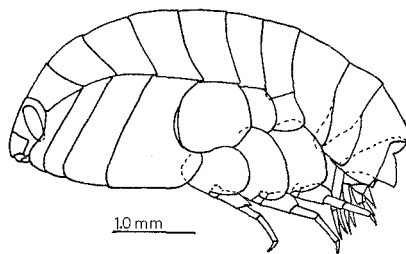


Fig. 185. *Lepidepereum vitjazi* Gurjanova.  
Female, 6.25 mm.

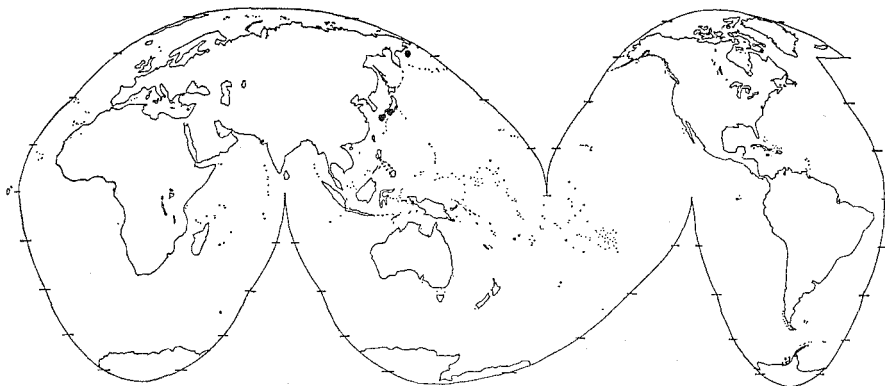


Fig. 186. Distribution of *Lepidepereum vitjazi* Gurjanova (●) in the world.



2. Urosomite 1 shorter than pleonite 3, deeply concave dorsomedially, extending to about 1/3 of urosomite 2; urosomites 2-3 very short, dorsodistal end of urosomite 3 produced almost to middle of peduncle of uropod 3.

Antennae: Both antennae longer than head length. Segment 1 of peduncle of antenna 1 semicylindrical, flattened on inner side, produced dorsodistally, segment 2 about 1/3 as long as segment 1, about half part from base on segment 3 inserted into segment 2; accessory flagellum triarticulate, subequal to segment 1 of primary flagellum in length; primary flagellum 6-articulate, segment 1 about half as long as peduncular segment 1, ventrally with 4 pairs of aesthetascs, following segments distally with 1 or 2 aesthetascs. Antenna 2 longer than antenna 1, slender, segment 2 as broad as long, gland cone stout, short, produced vertically, segment 3 the longest, hige-like distally, with 2 opposite setae, segments 4-5 pubescent dorsally, segment 4 shorter and a little thicker than segment 3, with 1 dorsodistal pair of plumose setae, segment 5 shorter than segment 4; flagellum 6-articulate.

Mouthparts: Epistome broadly projected in front of upper lip, upper lip complex, typical in the genus. Shoulders of lower lip developed, gradually narrowing, densely hairy, mandibular process rather small; inner plate small, fused into each other basally, densely hairy. Inner plate of maxilla 1 small, hairy, with 2 short and long stout hairy setae; outer plate bristly on inner side, obliquely truncate inward, apically with 7 broad and stout teeth serrated on inner side; palp biarticulate, stout, extended far beyond outer plate, apically with 7 small conical teeth and 1 small seta. Maxilla 2 hairy; inner plate with 3 hairy stiff, 4 stiff and 6 slender setae; outer plate longer and broader than inner plate, with 5 hairy and

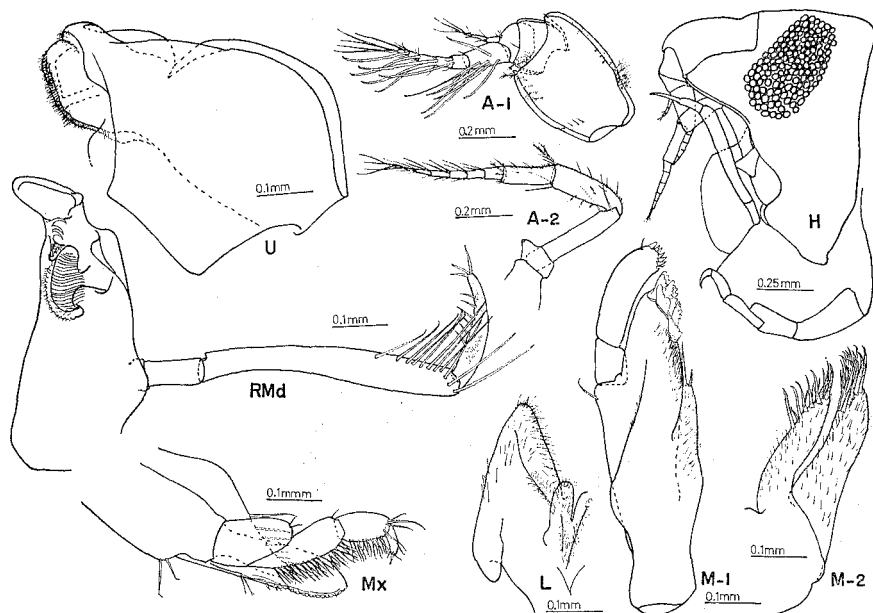


Fig. 187. *Lepidepecreum vitjazi* Gurjanova. Female, 6.25 mm.

7 or 10 slender simple setae. Both mandibles similar, incisor broad, distinctly produced, with 1 small blunt tooth, lacinia mobilis absent, accessory spines 3, molar process medium, palpal hump small; palp triarticulate, growing out under level with molar process, slender, medial segment 4 times as long as proximal segment, on 1/3 part from distal end with 1 row of 11 long setae, distal segment falcate, blunt apically, with 6 short and 3 apical short setae. Maxilliped medium; inner plate medium, apically with 3 conical teeth; outer plate not extended beyond segment 2 of palp, semioval, with 15 conical teeth and 6 small spines; palp 4-articulate, segment 1 broad, with 1 pair of small setae, segment 2 the longest, each of segments 2-3 inner-marginally with 16 and 8 pairs of setae, dactyl falcate, with 1 apical stout spine.

Gnathopod 1: Coxa 1 rectangular. Gnathopod 1 subchelate, small, slender, almost uniform in width. Basis about half as long as gnathopod 1, dispersively setose anteriorly. Ischium short, pubescent posteriorly. Merus extended posteriorly, longer than ischium. Carpus subequal to ischium and merus combined in length, pubescent posteriorly, half part from base triangular. Propod a little shorter than carpus, rectangular, densely setose anteriorly, posteriorly with several setae; palm gently transverse, defined by 1 pair of spines, else with 2 proximal and distal spines, 1 pair of setae and 1 row of 4 setae. Dactyl stout, a little extended beyond palm in closed, with 1 tooth near apex.

Gnathopod 2: Coxa 2 rectangular, gradually widening a little downward. Gnathopod 2 minutely chelate, slender, almost uniform in width, longer than gnathopod 1. Basis shorter than half as long as gnathopod 2. Ischium about half as long as basis. Merus longer than half as long as ischium, gradually dilating a little, posteriorly pubescent and with 1 row of 4 small setae. Carpus a little shorter than ischium, pubescent, gradually widening on 2/3 part from base. Propod half as long as carpus, pubescent, anterodistal spine formula 4-5-3, posterodistal end produced with 6 small spines; palm short. Dactyl stout, small, extended beyond posterodistal end of propod, with 1 tooth near apex.

Pereopod 1: Coxa 3 similar to coxa 2. Pereopod 1 slender. Basis 2/5 as long as pereopod 1, posterodistally with 1 pair of small setae. Ischium small. Merus and carpus setose posteriorly, about half as long as basis, merus a little produced anterodistally. Propod as long as and as broad as carpus, pubescent posteriorly, with 6 groups of 1 spine and 1 small seta and 1 pair of locking spines hooked distally. Dactyl falcate, about half as long as propod, with 1 small seta near apex.

Pereopod 2: Coxa 4 L-formed, distal widest part twice as broad as basal one. Pereopod 2 similar to pereopod 1.

Pereopod 3: Coxa 5 about half as deep as coxa 4, rectangular. Basis smaller than coxa 5, almost circular, anteriorly with 18 small spines and 1 distal pair of spines, on anterior 1/3 part from distal end pubescent, posterior thin plate much expanded, reaching near middle of merus. Ischium twice as broad as long, pubescent anteriorly. Merus most expanded backward at 2/3 from base, extending to middle of carpus posteriorly, posterior half part from distal end with 5 spines,

anterior margin pubescent, anterior setae formula 4-3-3. Carpus anteriorly pubescent and with 8 small spines and 1 distal group of 3 spines. Propod longer and a little narrower than carpus, anteriorly pubescent and with 2 single spines, 2 pairs of spines and 1 pair of locking spines. Dactyl falcate, half as long as propod.

Pereopod 4: Coxa 4 subrectangular, posterior expansion deeper. Pereopod

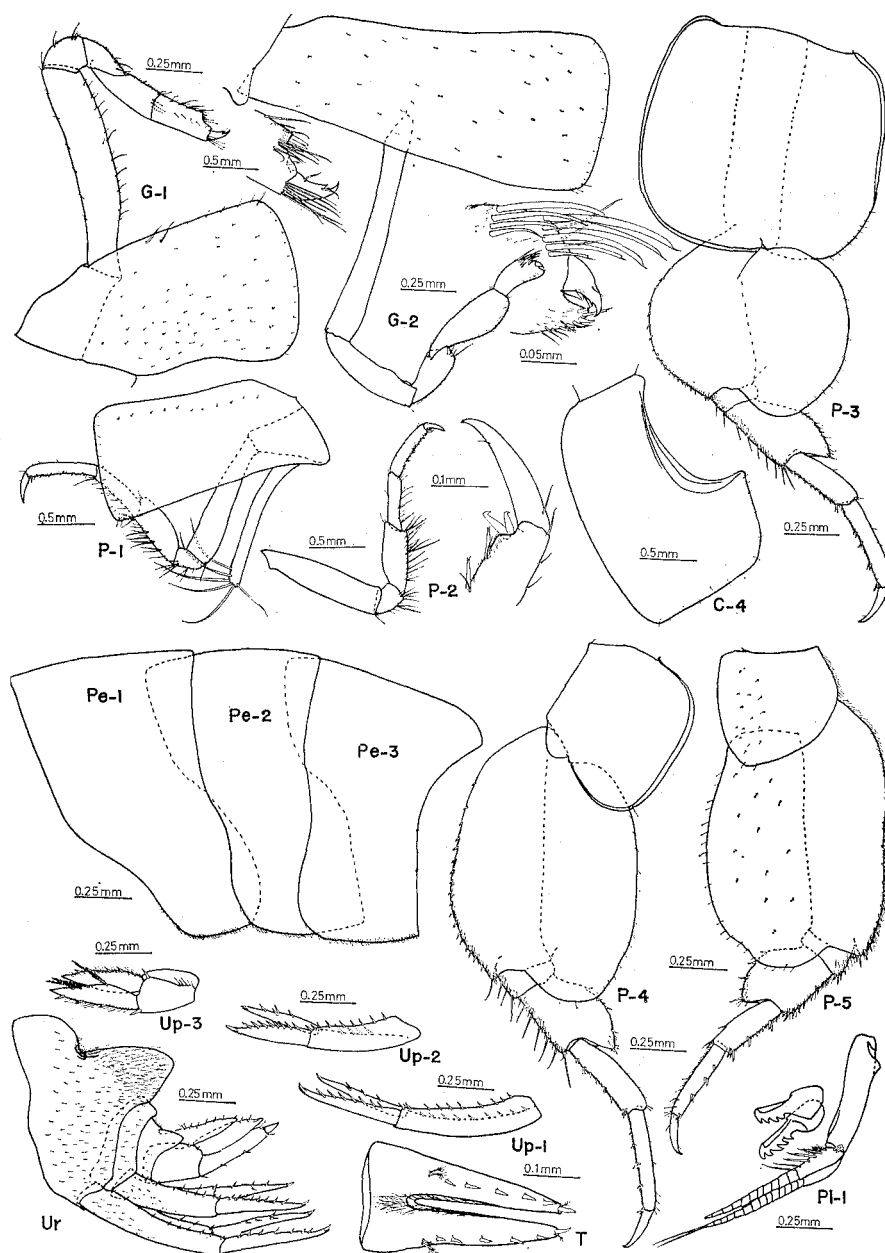


Fig. 188. *Lepidepecreum vitjazi* Gurjanova. Female, 6.25 mm.

4 similar to pereopod 3 in shape except basis oval and longer than one of pereopod 3, and merus anteriorly with spines and setae.

Pereopod 5: Coxa 7 a little smaller than coxa 6. Pereopod 5 similar to pereopod 4 in shape and size, but anterior margin without any long and short setae.

Pleopods: Pleopod 1 slender, peduncle shorter than rami; proximal segment of outer ramus with 4 bifid setae; terminal swimming setae shorter than half as long as rami.

Uropods: Uropod 1 extended beyond uropod 2, peduncle longer than rami, each of dorsolateral margins with 10 spines; both rami equal in length, apically with nail-like process, outer ramus with 7 spines, inner ramus with 2 single spines and 1 pair of spines. Uropod 2 similar to uropod 1, but shorter; peduncle with 8 outer and 5 inner spines; outer ramus with 8 spines, inner ramus with 2 single spines and 1 pair of spines. Uropod 3 about half as long as uropod 1; peduncle shorter than rami, outer and ventral margins with 1 apical spine; rami equal in length, foliaceous, outer margin of outer ramus pubescent, with 3 spines, inner ramus pubescent, with 5 spines.

Telson: Telson about half as long as uropod 3, deeply cleft, central line pubescent, both lobes with 1 pair of small pinnate setae, 5 spines and 1 apical group of 1 spine and 1 small pinnate seta.

*Remarks.* The present species has been already reported by Nagata (1965a) from Seto Inland Sea, Japan. My specimens are closely allied with Nagata's remarks except for the following points; basis of pereopods 3-5 serrate posteriorly, uropod 3 setose, telson with 5 pairs of spines and not bristly on central part of back, and antennae carinate.

### *Hippomedon*

#### *Hippomedon pacificus* Gurjanova, 1962

(Figs 189-193)

*H. pacificus*: Gurjanova 1962, p. 111-115.

Material examined: Male, 8.5 mm. Shijiki Bay. Collection No.: AMBL-Amph. 23, 66. (9 specimens).

Body: Densely hairy, with many sensory setae, exoskeleton hard, coxae medium. Head longer than pereonite 1, rostrum small, anterior head lobe slightly produced. Eyes large, oval. Pereonite 1 longer than deep, pereonites growing deeper. Pleonite 3 prominently extended backward above urosomite 1; pleonal epimeron 1 produced forward anteroventrally; pleonal epimeron 2 pectinate and rounded anteroventrally, posteroventrally with 1 small blunt notch; pleonal epimeron 3 expanded forward, rounded, largely upturned and taper posteroventrally, with 1 small notch on upper base of tooth. Urosomite 1 gently concave dorso-medially; urosomite 3 with 1 spine on each distolateral angle, lateral expansions semioval, developed, covering about half part of peduncle of uropod 3.

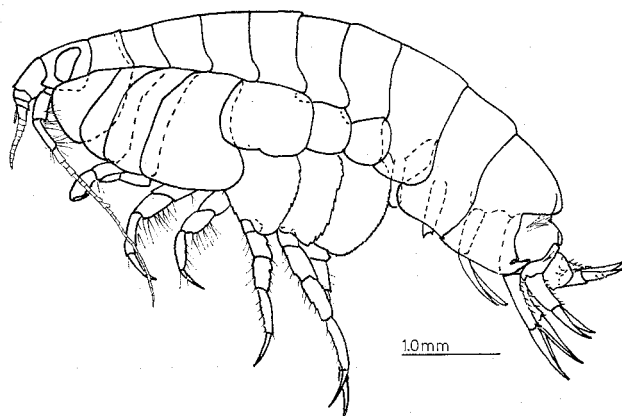


Fig. 189. *Hippomedon pacificus* Gurjanova. Male, 8.5 mm.

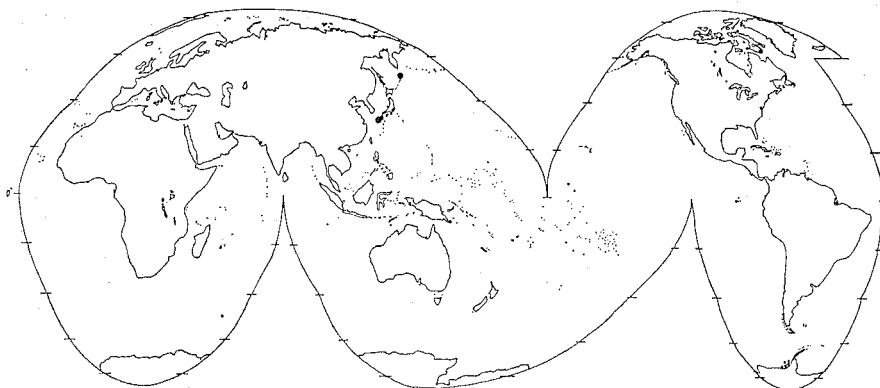


Fig. 190. Distribution of *Hippomedon pacificus* Gurjanova (●) in the world.

**Antennae:** Segment 1 of peduncle on antenna 1 about  $2/3$  as long as head length; stout, ventrally with 1 longitudinal row of many small pinnate setae and about 10 distal small pinnate setae, segment 2 very short, distally with 2 opposite groups of 1 pinnate and 1 simple setae, segment 3 very short, produced forward dorsally; accessory flagellum triarticulate, a little extended beyond segment 1 of primary flagellum, segment 2 distally with 1 stout pinnate seta; segment 1 of primary flagellum a little shorter than peduncular segment 1, a little decreasing in thickness, ventrally with many short aesthetascs in rows, terminal segment apically with 1 small pinnate seta. Antenna 2 shorter than half as long as body length; gland cone of peduncular segment 2 developed, segment 4 about twice as long as segment 3, growing broader, ventrally with 1 proximal row of 6 small pinnate setae and 1 distal transverse row of 16 simple setae, segment  $5\frac{3}{2}$  as long as and narrower than segment 4, surrounded by long and short simple setae ventrodistally; segment 1 of flagellum about  $2/3$  as long as peduncular segment 5.

**Mouthparts:** Apical margin of upper lip rounded, finely pectinate. Lower lip lacking inner plate, mandibular process well developed, shoulders rectangular,

slightly concave medially. Maxilla 1 densely bristly; inner plate developed, long-oval, with 4 inner small and 4 apical pinnate setae; outer plate with 6 stout conical, 1 small conical and 4 smaller pectinate teeth; palp broad, extended far beyond outer plate, biarticulate, distal segment gently curved, inner half margin from distal end with 16 teeth of which apical 2 are pectinated in 2 rows, else apex with 1 stout

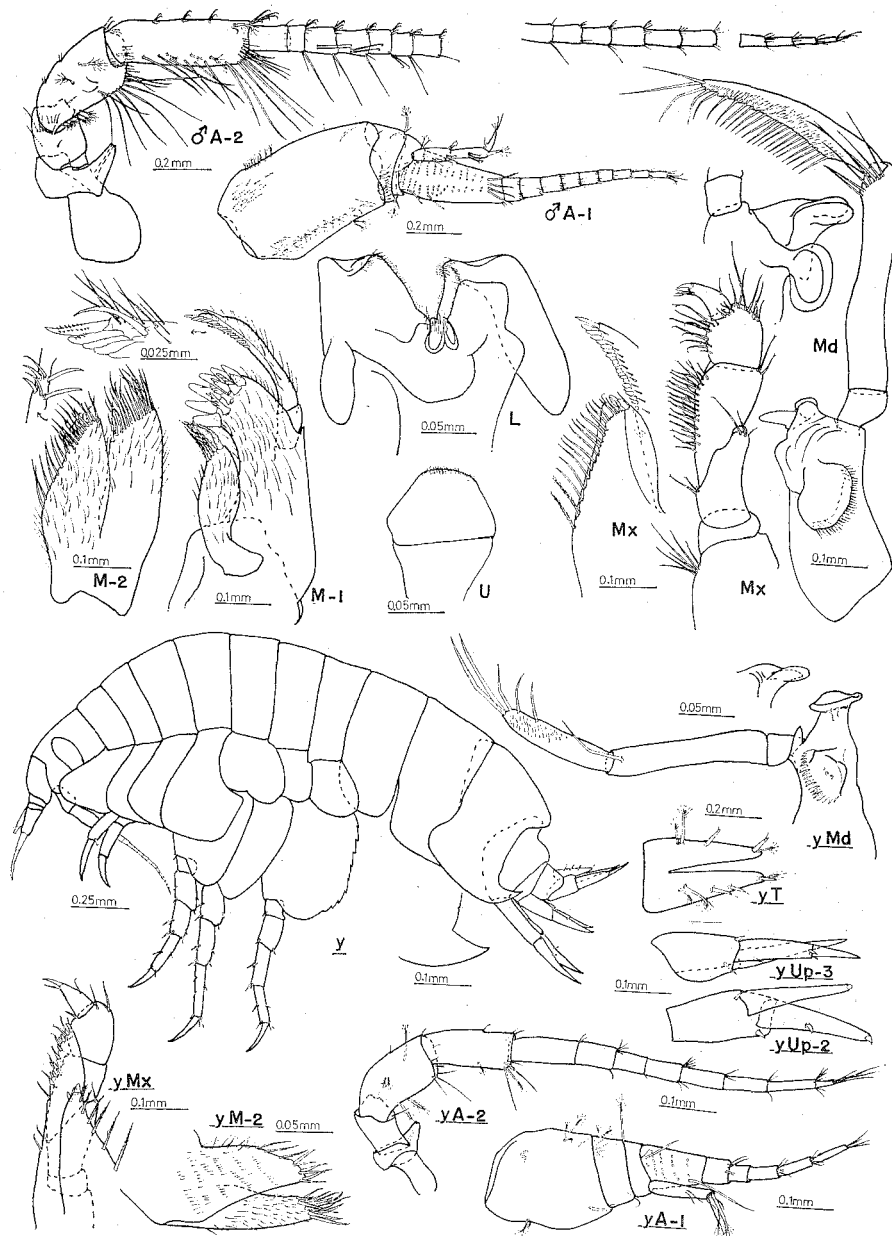


Fig. 191. *Hippomedon pacificus* Gurjanova. Male, 8.5 mm. y, yA-1, yA-2, yMx, yM-2, yMd, yUp-2, yUp-3, yT; Young, 2.75 mm.

simple seta. Maxilla 2 bristly; inner plate medially with 1 row of about 19 simple setae, inner 1/4 part from apex with about 8 pairs of setae in 1 row; outer plate apically setose in rows. Both mandibles similar, lacking accessory blades: incisor and lacinia mobilis flattened, rounded apically; molar process developed; palp growing out on outer apex, triarticulate, slender, proximal segment short, medial segment uniform in width, about half as long as palp, distally with 1 oblique row of 7 short setae, distal segment a little shorter than medial segment, falcate, compressed proximally, bristly in rows on inner side, with 1 longitudinal row of 20 short and 3 apical long setae. Maxilliped rather undeveloped, especially palp not elongate; inner margin of inner plate with 1 longitudinal row of 17 pinnate setae, apex with 3 conical teeth and 1 seta; outer plate reaching middle of palp segment 3, inner half part from apex with 1 proximal pair of teeth, 1 row of 22 conical teeth, and 1 apical pectinate tooth, else twelve small setae growing along row of teeth; palp 4-articulate, inner margin of segment 2 setose in rows, segment 3 rounded, setose distally, dactyl falcate, short, stout, apically with 1 nail-like tooth and 3 inner small setae.

Gnathopod 1: Coxa 1 extended forward, posteroventrally with 1 small notch armed with 1 minute seta. Gnathopod 1 slender, almost uniform in width, subchelate. Basis about 1/3 as long as gnathopod 1, with 1 anterodistal bundle of short setae and 1 posterodistal group of 2 long, 2 short and 1 minute setae. Ischium about half as long as basis, anterior half margin from distal end forming groove, outer-medially with 1 short seta. Merus a little shorter than ischium, gradually expanding, posteriorly with 4 long bifid setae and 1 group of 1 long bifid

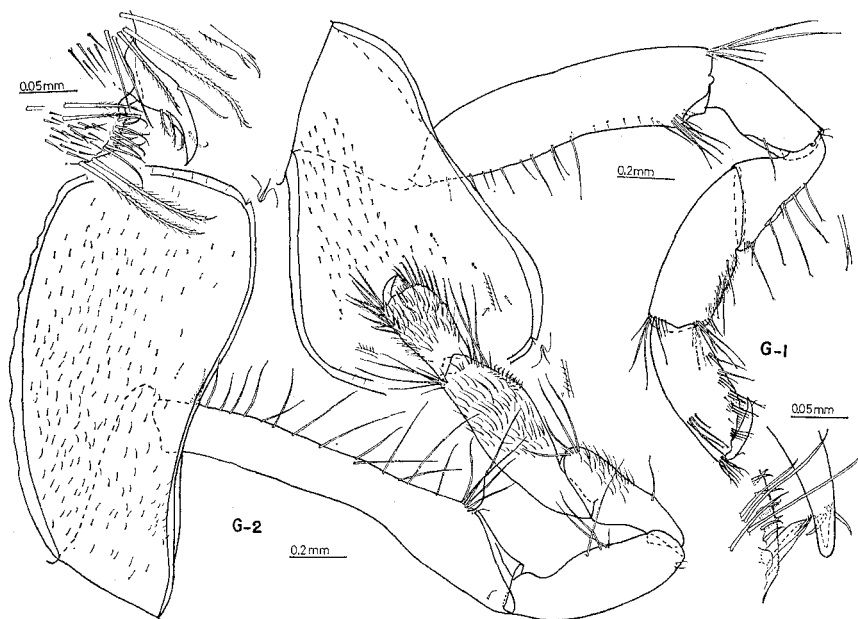


Fig. 192. *Hippomedon pacificus* Gurjanova. Male, 8.5 mm.

and 4 small setae. Carpus longer than ischium, pubescent posteriorly, anterodistal and posterodistal ends surrounded by 7 and 10 short and long setae respectively, else posteriorly with 3 bifid setae. Propod subequal to ischium in length, uniform in width, anteriorly pubescent and with 1 transverse row of 4 bifid setae on outer-medial margin and about 7 inner-distal short setae, posterior setae formula 3-5-4 on outer side and 6 on inner margin; palm oblique, defined by 1 pair of spines, straight, finely serrate. Dactyl falcate, reaching palmar distal spines in closed, with 2 apical minute setae.

Gnathopod 2: Coxa 2 gently sinuous posteriorly, posteroventrally with 1 small notch armed with 1 minute seta. Gnathopod 2 almost uniform in width, longer than gnathopod 1, subchelate. Basis about  $\frac{3}{7}$  as long as gnathopod 2, expanded at anterior  $\frac{1}{4}$  from distal end, setose anteriorly, posterior expansion with 1 bundle of 7 long and short setae. Ischium about half as long as basis, compressed proximally, anteromedially with 3 long and 1 small setae. Merus  $\frac{3}{4}$  as long as ischium, compressed proximally, bristly on posterior half margin from distal end, distal concavity receiving carpus, posterodistally with 4 pectinate long setae. Carpus nearly as long as ischium, half part from distal end bristly, posteriorly with 3 longitudinal rows of 8 spines, and 3 long minutely pinnate and a few small setae, anteriorly with 7 long and short pectinate setae. Propod half as long as carpus, subrectangular, densely bristly, anterodistally with many minutely pinnate setae in rows; anterodistal margin and palm continuously rounded, with 9 pectinate setae, undefined, with 2 rows of small simple setae, long pinnate setae tricuspid. Dactyl short, falcate, inner half part from distal end with 4 minutely pinnate setae.

Pereopod 1: Coxa 3 similar to coxa 2. Pereopod 1 setose in from merus to propod, setae bifid or simple. Basis about  $\frac{1}{3}$  as long as pereopod 1. Ischium small. Merus about half as long as basis, anterodistal end prominently produced, with 4 long bifid setae. Carpus shorter than merus, posterior bifid setae formula 3-3-1-2-3-1-2-4. Propod subequal to carpus in length, with 2 anterodistal bifid setae and 7 posterior pairs of bifid setae. Dactyl as long as propod, falcate, hooded apically.

Pereopod 2: Coxa 4 L-shaped. Pereopod 2 very similar to pereopod 1 except more densely setose.

Pereopod 3: Coxa 5 bilobate, divided by shallow concavity, both lobes equal in size, rounded. Basis larger than coxa 5, most expanded proximally, distal part about half as broad as basal part, serrate posteriorly and anteriorly, each anterior notch with 1 or 3 spines, anterodistally with 5 spines, posterior thin plate extended a little beyond ischium. Ischium small, almost square, anterodistally with 5 spines. Merus  $\frac{3}{2}$  as long as ischium, most expanded at  $\frac{1}{3}$  from base, with 3 anteromedial groups of 3 spines and 4 anterodistal spines, central spine in these groups the longest, posterior margin produced distally, with 5 spines of which one bears on distal end of expansion. Carpus as long as merus, with 2 anteromedial groups of 3 spines, of which central one is long, and 6 anterodistal, 2 posteromedial and 1 posterodistal spines. Propod longer and distinctly narrower than carpus, with 4 anteromedial



pairs of spines, one of these paired spines longer and taper, the other short and apically blunt, else with 1 anterodistal pair of locking spines, 2 posteromedial spines and 1 posterodistal group of 2 spines and 2 setae. Dactyl scimitar, shorter than propod, finely undulated anteriorly.

Pereopod 4: Coxa 4 bilobate, but almost rectangular, anterior lobe small.

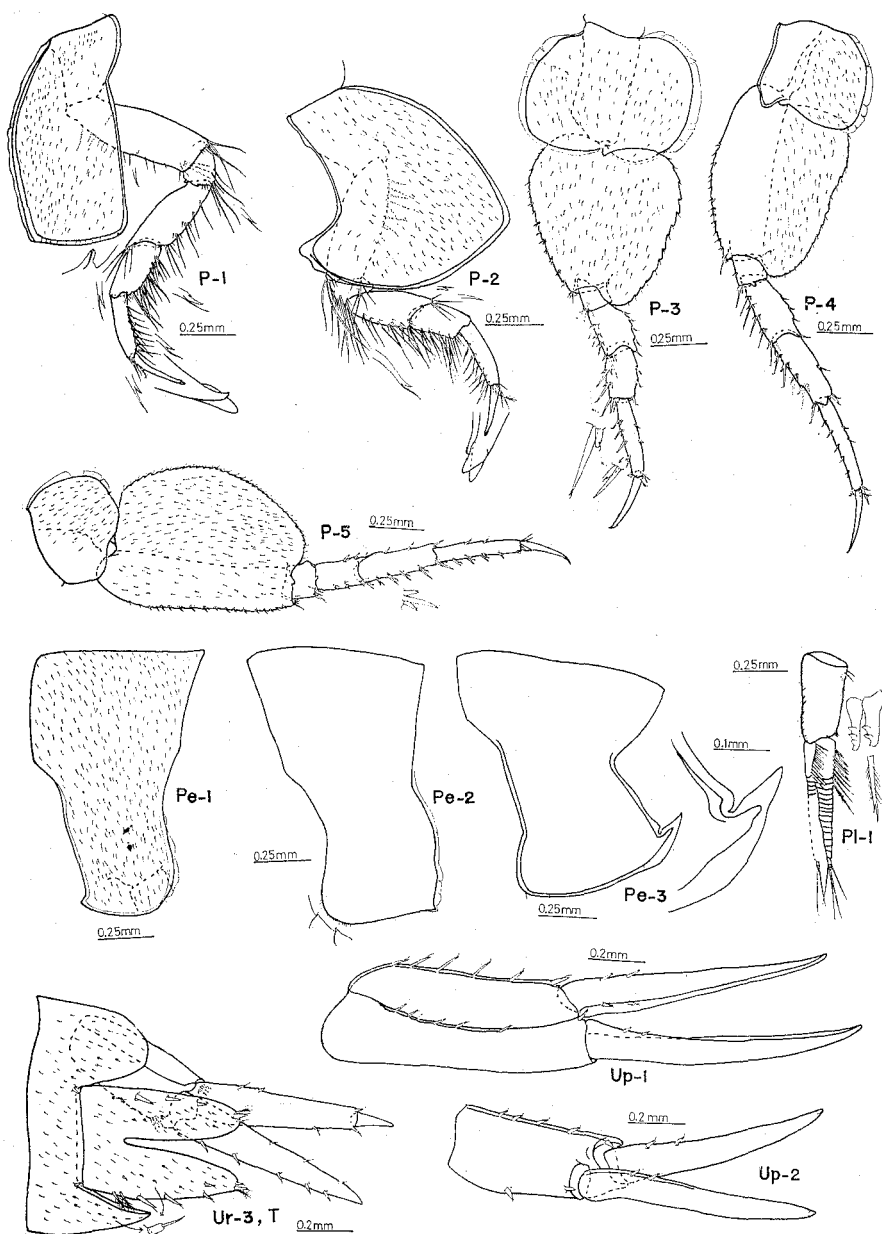


Fig. 193. *Hippomedon pacificus* Gurjanova. Male, 8.5 mm.

Pereopod 4 more elongate than pereopod 3. Basis subrectangular, extended posteriorly, most expanded basally, anteriorly spinous in singles and pairs, anterodistal group consisting of 1 long and 4 small spines, posterior margin finely serrate. Ischium small, square, anteriorly with 1 medial pair of spines and 1 distal group of 3 spines of which central one is long. Merus about twice as long as ischium, extended posterodistally, anterior spine formula 3-3-3-3-4, central spine in these groups of 3 spines the longest, posterior spines 4 of which one bears on apex of extension. Carpus a little longer than merus, anterior spine formula as one of merus, posterior margin with 1 medial and 2 distal spines. Propod longer and narrower than carpus, anteriorly with 4 pairs of spines and 1 distal pair of locking spines, posteriorly with 2 medial and 3 distal spines. Dactyl scimitar, subequal to carpus in length, anterior margin finely undulated.

Pereopod 5: Coxa 7 semicircular, ventral margin sinuous. Pereopod 5 similar to pereopod 4 except basis bristly and gently expanded posteromedially, and merus shortened.

Pleopods: Pleopods similar; peduncle stout, about half as long as rami, hairy; swimming setae short.

Uropods: Uropod 1 not extending far beyond uropod 3; peduncle shorter than rami, stout, with 6 outer and 7 inner spines; both rami equal in length, scimitar, outer ramus proximally with 2 pairs of 2 opposite spines, inner ramus with 2 inner-proximal spines. Uropod 2  $2\frac{2}{3}$  as long as uropod 1; peduncle about  $\frac{2}{3}$  as long as rami, stout; with 5 outer and 2 inner spines; rami equal in length, scimitar, blunt apically, on each proximal margin with 2 spines. Uropod 3 shorter than uropod 2; peduncle  $\frac{2}{3}$  as long as rami, with 3 outer-ventrodistal and 3 inner-dorsodistal spines; outer ramus biarticulate, subequal to inner ramus in length, proximal segment with 2 outer-proximal, 1 inner and 2 opposite distal spines, terminal segment conical,  $\frac{1}{4}$  as long as proximal segment, naked; inner ramus with 3 outer and 5 inner spines.

Telson: Telson extending far beyond peduncle of uropod 3, cleft beyond  $\frac{1}{3}$  from base, densely bristly, with several sensory setae on both lobes, apex of each lobe rounded, with 1 group of 2 spines and 1 pinnate seta, outer margin on right lobe with 1 proximal pinnate seta and 3 single spines, and on left lobe with 1 proximal pair of pinnate setae, 2 medial spines and 1 distal pair of spines.

*Remarks.* The present specimens are closely allied with Gurjanova's description and figures (1962) except for the following trifle differences; (1) propod of gnathopod 1 slightly expanded distally, (2) carpus of gnathopod 1 dilated near distal end, (3) merus of pereopod 5 slightly expanded distally and (4) telson marginally with 3 pairs of spines.

*Anonyx*

*Anonyx simplex* sp. nov.

(Figs 194-196)

Body: Rather slender. Head subequal to pereonite 1 in length, rostrum obsolescent, anterior head lobe producing to middle of peduncular segment 1 of antenna 1. Eyes large, reniform. Pereonite 1 longer than deep. Pleonal epimeron 1 a little produced anteroventrally, its apex acute, with 5 posterior setae; posteroventral tooth of pleonal epimeron 2 acute and stout; pleonal epimeron 3 rounded and gradually going up, with 3 ventral setae and 1 posteroventral broad tooth. Urosome rather slender, longer than pleonite 3; urosomite 1 ventrodistally with several setae, concave dorsomedially; posterior expansion of urosomite 3 well developed, with 2 dorsodistal opposite spines.

Antennae: Antenna 1  $1\frac{1}{4}$  as long as body length; segment 1 of peduncle not stubby, segments 2-3 reduced in length and width; accessory flagellum 5-articulate, as long as peduncle, segment 1 thick, shorter than following segments combined, not extended beyond segment 1 of primary flagellum; segment 1 of primary flagellum longer than half as long as peduncle, on inner side with many short aesthetascs in transverse rows, following segments gradually reduced in size, mostly with 1 aesthetasc except terminal segment. Antenna 2 longer than antenna 1; segment 2 of peduncle short, gland cone weakly developed and perpendicularly extended, segment 3 produced dorsally, segment 4 equal to or a little longer than segment 3, densely setose in transverse rows dorsally, ventrally with 5 distally pinnate setae and 1 ventrodistal bundle of long and shorter setae, segment 5 a little shorter and narrower than segment 4, densely setose in transverse rows dorsally, ventrodistally with 2 distally pinnate and several small setae; flagellum thick.

Mouthparts: Upper lip ordinary in *Anonyx*-group, densely hairy, epistome broadly produced, not extended beyond middle of upper lip. Lower lip lacking inner plate, outer plates broadly divided in V-form, shoulders rectangular, mandibular process medium. Inner plate of maxilla 1 smaller, apically with 2 stout pinnate setae, outer plate densely bristly in rows on outer margin and densely bristly in patches on inner margin, with 11 tooth-like spines of which are multidentate; palp biarticulate, proximal segment short, apex of distal segment deeply serrate, with 7 conical spines on each protrusion and 1 small seta. Inner plate of maxilla 2 about half as large as outer plate, densely hairy on inner margin, with 1 proximal stout pinnate seta, and 3 rows of opposite simple setae and several pinnate setae on central line between opposite setae; outer plate dispersively bristly in rows innerproximally, with 6 lateral slender setae dispersively armed with setae, and 6 stout

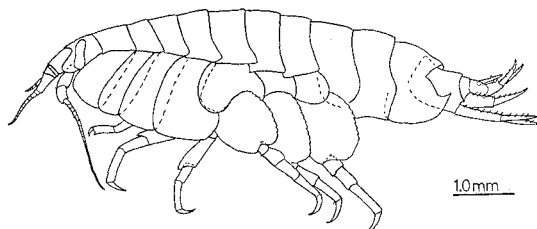


Fig. 194. *Anonyx simplex* sp. nov. Holotype, male, 7.25 mm.

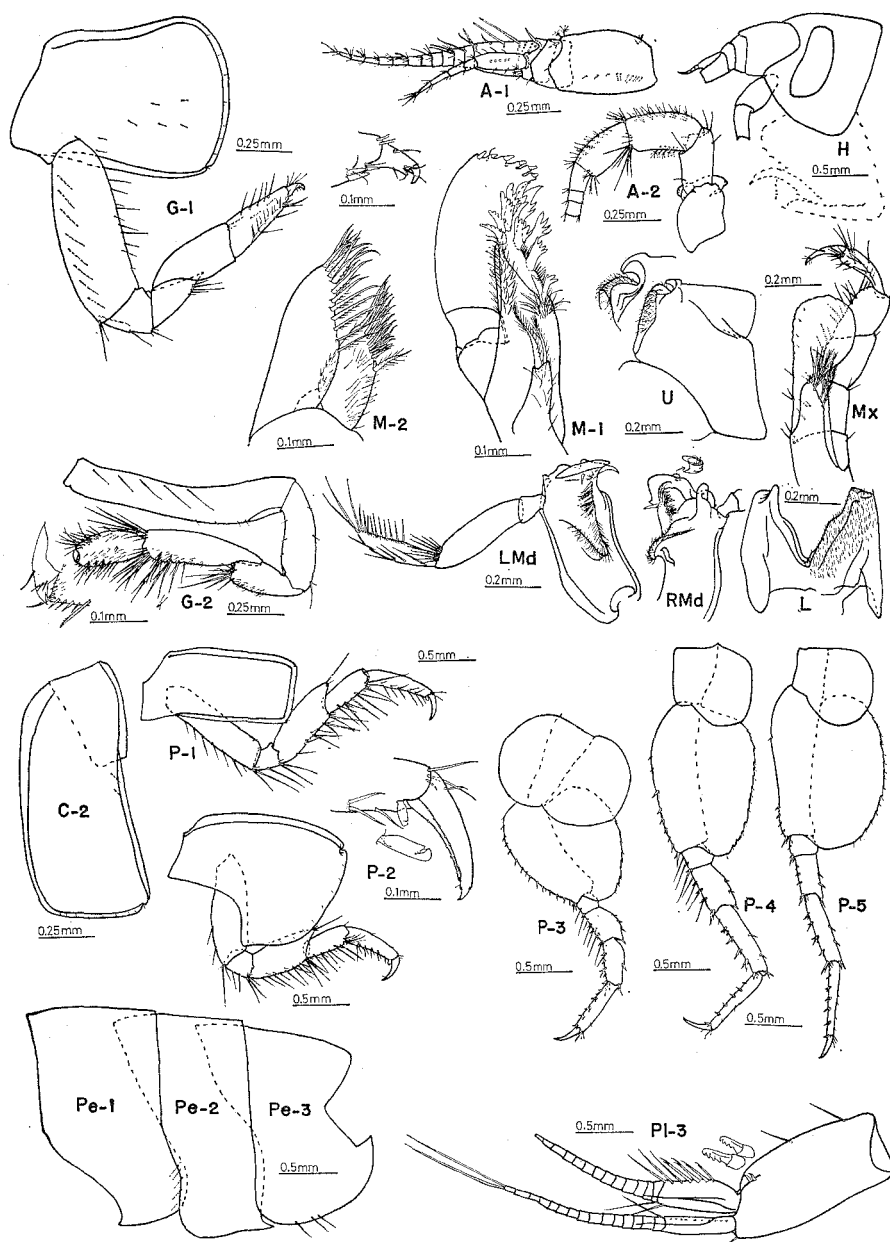


Fig. 195. *Anonyx simplex* sp. nov. Holotype, male, 7.25 mm.

and 7 feeble setae on distal part. In left mandible, incisor broad, prominently produced, with 1 conspicuous tooth, on outer distal margin with 1 lamina; lacinia mobilis vestigial, spine-like; accessory simple spine 1, outer 6 setae pinnate; molar process large, forming densely hairy band; palp placing near apex, triarticulate, developed, proximal segment small, middle segment distally with 1 oblique row

of 9 short setae, distal segment shorter than middle segment, falcate, blunt apically, inner proximal part naked, following part minutely bristly, with 10 short stiff and 3 longer stiff setae, outer margin with 5 setae. Right mandible very similar to left mandible, but lacking lacinia mobilis and 1 accessory simple seta, else incisor with 1 accessory disk. Inner plate of maxilliped medium, with 3 conical teeth, 3 simple and 4 pinnate setae and 1 small spine; outer plate spatulate, rounded, inner and apical margins with 16 small conical teeth; palp rather slender, 4-articulate, not densely setose, segment 3 gradually dilating, dactyl falcate.

Gnathopod 1: Coxa 1 rectangular, posteroventrally with 1 small notch armed with 1 seta. Gnathopod 1 simple. Basis  $3/7$  as long as gnathopod 1, uniform in width, dispersively setose in 1 longitudinal row both marginally. Ischium short. Merus longer than ischium, triangular, posterodistally with 1 longitudinal row of 5 setae. Carpus about half as long as basis, triangular proximally, only with 1 anterodistal pair of small setae. Propod shorter than carpus, gradually reducing in width, lacking palm, posterodistally with 1 pair of spines and 1 locking spine, less setose, setae arrayed longitudinally. Dactyl small, with 1 nail and 1 apical tooth.

Gnathopod 2: Coxa 2 deeper and narrower than coxa 1, posteroventrally with 1 small notch armed with 1 seta. Gnathopod 2 slender, minutely subchelate. Basis  $3/7$  as long as gnathopod 2. Ischium half as long as basis. Merus geniculating to ischium,  $2/3$  as long as ischium, densely pubescent on posterior half margin from distal end, with 8 distal setae. Carpus growing out on anterior half part from distal end,  $3/2$  as long as merus, anterodistally with 7 setae, posterior half part from distal end densely pubescent, with 5 rows of setae of which numbers gradually increase. Propod about half as long as carpus, long oval, densely bristly, both anteriorly and posteriorly setose in rows; palm short, transverse. Dactyl small, stout, with 1 tooth on grasping margin, a little overlapping palm in closed.

Pereopod 1: Coxa 3 similar to coxa 2. Basis about  $1/3$  as long as pereopod 1. Merus a little extended and expanded anteriorly, anterodistally with 2 long and small setae, posterior margin  $2/3$  as long as basis. Carpus half as long as basis. Propod as long as posterior margin of merus, posteriorly with 5 pairs of setae and 1 locking spine which is notched near apex and is blunt. Dactyl falcate, grasping margin with 7 pairs of opposite conical small protrusions.

Pereopod 2: Coxa 4 L-formed, ventral half part expanded, proximal part  $2/3$  as broad as most expanded one. Pereopod 2 very similar to pereopod 1.

Pereopod 3: Coxa 5 bilobate, symmetrical, each lobe almost semicircular. Basis subequal to coxa 5 in size, oval, most expanded proximally, anteriorly with 16 single spines and 1 distal group of 3 spines overall, finely serrate posteriorly, posterodistal extension not beyond ischium. Ischium short, square, anterodistally with 1 group of 1 seta and 1 spine. Merus twice as long as ischium, most expanding backward at  $1/3$  point from base, produced posterodistally, anteriorly with 1 seta, 1 group of 1 spine and 1 seta, and 3 groups of 1 seta and 3 spines, posteriorly with 3 and 1 apical spines. Carpus as long as ischium and merus combined, anterior

spine formula 2-1-2-1-3, posterior margin with 1 or 2 distal spines. Propod distinctly longer than carpus, anteriorly with 2 single proximal spines and 4 pairs of spines, posteriorly with 1 spine and 4 small setae. Dactyl short, falcate.

Pereopod 4: Coxa 6 about half as broad as coxa 5, bilobate, anterior lobe vestigial. Pereopod 4 longer than pereopod 3. Basis about  $2/3$  as long as pereopod 4, winged, most expanded at  $1/3$  point from base, posteriorly almost straight and finely serrate, posterodistally not produced beyond ischium, anteriorly with 8 spines and 1 distal pair of spines. Ischium short, square, anterodistally with 1 group of 1 seta and 2 opposite spines. Merus longer than twice as long as ischium, slightly expanded, produced posterodistally, anteriorly with 1 stiff seta, 1 group of 1 stiff seta and 1 spine, 2 groups of 1 stiff seta and 2 opposite spines and 1 distal group of 4 spines, posteriorly with 2 medial and 1 apical spines. Carpus longer than ischium and merus combined, anteriorly with 2 single spines and 5 pairs of spines, posteriorly with 2 medial spines and 1 distal pair of spines. Propod slightly longer than carpus, anteriorly with 1 proximal spine and 5 pairs of spines, posterodistally with 1 spine and a few small setae. Dactyl short, falcate.

Pereopod 5: Coxa 7 similar to coxa 6. Pereopod 5 similar to pereopod 4 except for the following points: Basis slightly concave anteromedially and gently rounded posteriorly, with 1 lonely spine at anterior  $1/3$  point from base, less spinose. Anterior margin of ischium and merus lacking stiff setae.

Pleopods: Pleopods well developed. Peduncle of pleopod 3 stout,  $2/3$  as long as rami, anterodistally with 1 spine, coupling spine serrate; outer ramus with 1 longitudinal row of 12 pinnate setae, inner margin of inner ramus with 1 longitudinal row of 4 bifid and 3 simple pinnate setae; terminal swimming setae about half as long as rami.

Uropods: Uropod 1 not extended beyond uropod 3; peduncle as long as rami, with 11 outer small and 5 inner long spines; both rami equal, attenuate, each with 1 apical spine, outer ramus with 4 outer and 1 inner spines, inner ramus with 1 outer-distal and 4 inner spines. Uropod 2  $2/3$  as long as uropod 1; peduncle shorter than rami, with 8 outer and 3 inner spines; both rami equal, attenuate, each with 1 apical spine, outer ramus with 4 outer spines, inner ramus with 3 outer spines and 1 deep notch armed with 1 long stout spine. Uropod 3 shorter than

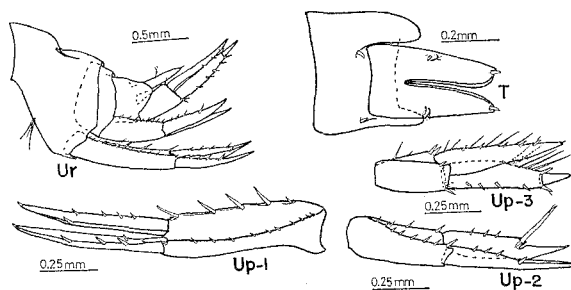


Fig. 196. *Anonyx simplex* sp. nov. Holotype, male, 7.25 mm.

uropod 2; peduncle  $2/3$  as long as rami, dorsodistally with 1 inner and 2 outer spines, else ventrodistal spines 3; both rami equal in length, attenuate; outer ramus bi-articulate, proximal segment with 4 and 1 apical spines on outer margin, inner half margin from distal end with 5 setae and 1 apical spine, distal segment about  $1/3$  as long as proximal segment, conical, with 1 apical minute seta; inner ramus with 2 outer and 5 inner spines, and 6 marginal short and 1 apical minute setae.

Telson: Telson about half as long as uropod 3, deeply cleft to  $1/3$  point from base, each lobe with 1 apical spine and 1 outer-medial pair of small pinnate setae.

Material examined. Holotype: Male, 7.25 mm. Type-locality: Tomioka Bay. Date: May, 1978. Paratype: 4 specimens. Collection No.: AMBL-Amph. 86.

*Remarks.* The new species and *Anonyx cicada* Stebbing, 1888 (Stebbing 1906, Schellenberg 1926, Bellan-Santini 1974, Bellan-Santini & Ledoyer 1974) do not obligate to the definition of the genus *Anonyx* (J.L. Barnard 1969c) in the simple gnathopod 1, but other characters of these two species coincide with the definition of this genus.

The new species has the common character, the simple gnathopod 1, with *A. cicadoides*, but is clearly distinguished from it by the following points; (1) propod of pereopods 1-2 with 1 pair of simple locking spines, (2) gnathopod 1 lacking locking spines and (3) proximal segment of accessory flagellum normal in size.

(To be continued)

#### Errata

The scales of the text-figures in the parts I-IV of this series should be corrected as follows: 0.05 mm  $\rightarrow$  0.5 mm ; 0.025 mm  $\rightarrow$  0.25 mm ; 0.01 mm  $\rightarrow$  0.1 mm ; 0.005 mm  $\rightarrow$  0.05 mm ; 0.0025 mm  $\rightarrow$  0.025 mm.

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